



## **Proceedings of FASAL 6**

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## PREFACE

This volume contains papers presented at the Formal Approaches to South Asian Languages 6, held at University of Massachusetts, Amherst on March 12-13, 2016. We wish to thank Rajesh Bhatt and Miriam Butt for assistance in publishing these proceedings. We also wish to make a note about a notational use in glossing. The '=' in this volume refers to case-marking, without necessarily committing to the idea that case-markers are clitics.

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## **Production, Perception, and Distribution of Breathy Sonorants in Marathi**

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### ABSTRACT

Breathy sonorants are crosslinguistically rare, and while a small amount of existing work has focused on their acoustic properties much remains to be learned about their perception and their language-internal distribution. Herein, breathy sonorants in Marathi are investigated via instrumental acoustic analysis, a perception experiment, and corpus analysis. Results reveal that breathy sonorants are under-represented language-internally in addition to being typologically rare. The acoustic differences associated with sonorant phonation contrasts are less robust than those in obstruents. They are also prone to more perception errors than obstruents, and breathy sonorants are more heavily restricted phonotactically than breathy obstruents. These data contribute to a more nuanced understanding of breathy sonorants, and lend potential insight into their typology.

### **1. Introduction**

Though phonemic breathy voice is crosslinguistically rare, the breathy obstruents found in Indic phonemic inventories are well-known. What are not so well-known are breathy sonorants. Rare even among Indic languages, these sounds occur in just 1% of the languages in the UCLA Phonological Segment Inventory Database (UPSID). Much about their acoustic properties, perceptual salience, and language-internal distribution remains unknown. Marathi—the state language of Maharashtra—provides an ideal arena in which to investigate these sounds, because it contains multiple breathy sonorants across distinct places and manners of articulation. This study adds to the existing body of knowledge via Marathi data gleaned from a production study, a perception study, and analysis of phonemic frequencies in a Marathi corpus. In the following pages, a brief overview of breathy phonation and Marathi precedes sections devoted to each of the three studies.

#### **1.1 Overview of breathy phonation**

Breathy phonation is characterized by greater airflow than modal voice, and by a steep downward spectral slope—namely, strong low-frequency energy and weak higher-frequency energy (Gordon & Ladefoged 2001, Pennington 2005). Numerous scholars have investigated phonemic breathy phonation in vowels (Andruski & Ratliff 2000, Blankenship 2002, Esposito 2006, Khan 2012, Wayland & Jongman 2003) and in Indic obstruents (Alam *et al.* 2008, Berkson 2013, Berkson 2016, Davis 1994, Dutta 2007, Mikuteit & Reetz 2007, Ohala & Ohala 1972). These studies indicate that breathy voice is generally associated with greater values than modal voice in spectral measures like H1-H2 and increased noise as assessed by measures like Cepstral Peak Prominence (CPP). Many of the acoustic correlates of breathy consonants are housed in the following vowel (Berkson 2013, Dutta 2007, Esposito & Khan 2012), and the effect of consonant breathiness can perseverate throughout most or all of the following vowel (Berkson 2013, Dutta 2007). The values associated with breathiness, then—increased spectral values and increased noise in the signal—can be found consonant-externally, in the following vowel.

Work on breathiness in sonorants is limited, though Harris 2009 investigated breathy nasals and laterals in Sumi (Tibeto-Burman) and Traill and Jackson (1988) investigated breathy

nasals in Tsonga (Bantu). These studies suggest that sonorant breathiness is associated with the same spectral shape and increased noise associated with vowel/obstruent breathiness. Meanwhile, to the best of my knowledge no work has probed the perception of phonation contrasts in sonorants or perception of phonation contrasts in Marathi in general, so questions about the perceptibility of these contrasts abound. The same can be said of the distribution of breathy sonorants in the Marathi lexicon: anecdotally they seem to occur infrequently, but current data regarding their phonemic frequencies is limited. Many questions about these typologically rare sounds remain open, in other words, both in general and in Marathi in particular.

## 1.2 Overview of Marathi

Marathi is spoken by ~70 million people, mainly in Maharashtra (2001 India Census). As shown in the consonant inventory in Figure (1), it contains both the breathy obstruents for which Indic languages are known and the less common breathy sonorants.<sup>1</sup>

		Place of Articulation													
		Labial		Non-retroflex Apical				Retroflex		Alveo-Palatal		Velar		Glottal	
				Dental		Alveolar									
Manner of Articulation	Stop	p	b	t	d			t̪	ɖ			k	g		
		p <sup>h</sup>	b <sup>h</sup>	t <sup>h</sup>	d <sup>h</sup>			t̪ <sup>h</sup>	ɖ <sup>h</sup>			k <sup>h</sup>	g <sup>h</sup>		
	Nasal		m		n				ɳ				(ŋ)		
			m <sup>h</sup>		n <sup>h</sup>				ɳ <sup>h</sup>						
	Affricate					ts	dz			tʃ	dʒ				
						(ts <sup>h</sup> )	(dz <sup>h</sup> )			tʃ <sup>h</sup>	dʒ <sup>h</sup>				
	Fricative					s		(ʂ)		ʃ					h
Approximant		v		l				ɭ		j					
		v <sup>h</sup>		l <sup>h</sup>											
Rhotic										r					
										r <sup>h</sup>					

Figure (1) Marathi consonant inventory

We can see in Fig. (1) that despite their crosslinguistic rareness, breathy sonorants make up a relatively high proportion of Marathi’s consonant inventory. The three experiments described below each address a specific research question, but this program of research also aims to probe the connection between the crosslinguistic trend and the language-internal reality: by studying Marathi, can we learn something about breathy sonorants that sheds light on the typological pattern? This is a question to which we will return.

## 1.3 Research Questions

Three research questions are addressed herein.

<sup>1</sup> Chart developed with primary reference to Masica (1991), Pandharipande (1997), and Dhongde and Wali (2009). Sounds in parentheses are dubbed ‘marginal’ by Dhongde and Wali: the retroflex fricative, for instance, appears only in Sanskrit words and is largely produced as an alveo-palatal.

- Q1:** What are the acoustic characteristics of phonation contrasts in sonorants?  
**Q2:** Are phonation contrasts perceived as well in sonorants as in obstruents?  
**Q3:** How are breathy sonorants distributed language-internally?

Experiments addressing each of these questions are presented in separate sections below.

## 2. Experiment 1: Production

For a production experiment designed to probe the acoustic correlates of phonation contrasts in Marathi sonorants, ten native Marathi speakers (five female) were recorded producing Marathi words embedded in a carrier sentence. Stimuli featured plain and breathy obstruents and sonorants from the labial, dental, and alveo-palatal places of articulation in word-initial and word-medial positions before the vowels [a] and [e]. Recordings were made in a sound-attenuated booth. Data were analyzed using PRAAT (Boersma & Weenink 2010), VoiceSauce (Shue *et al.* 2011), and R (R Core Team, 2012).

Recall that, as outlined in Section 1.1, breathy phonation in vowels and obstruents is associated with increased measures of spectral slope and decreased measures of noise such as CPP. The data collected were subjected to a suite of acoustic analyses (including F0, H1-H2\*, H1-A1\*, H1-A2\*, H1-A3\*, and CPP), and the overall trend revealed is that the same holds true for sonorants: breathy voice in both obstruents and sonorants is associated with increased noise and increased spectral values. Consonant breathiness extends far into the subsequent vowel. There is also a theme that emerges in the data, however: acoustic differences triggered by phonation type are more reliably present in obstruent than in sonorant contexts. This is illustrated by the H1-A1\* data provided below, which are representative of the larger trend.<sup>2</sup>

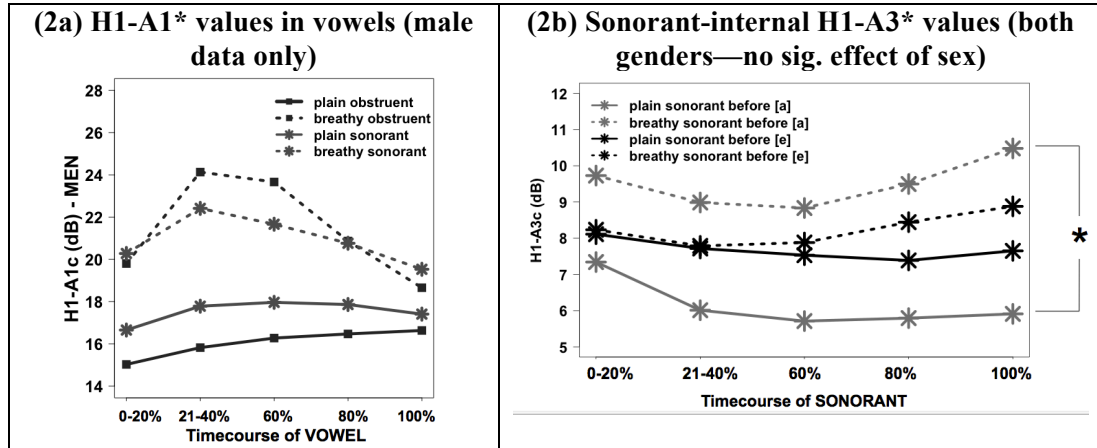
An omnibus repeated measures ANOVA was conducted wherein H1-A1\* was the dependent variable and the independent variables included Phonation type (modal and breathy), Obstruency (obstruent and sonorant), Place of articulation (labial, dental, alveo-palatal), Vowel context ([a] context and [e] context), Word position (initial and medial), and Speaker sex (male and female). This test revealed a Phonation type by Obstruency by Gender interaction ( $F(1,6) = 46.36, p = 0.0005$ ). Post hoc tests indicated a significant effect of consonant phonation type for males for vowels after obstruents ( $F(1,4) = 29.25, p = 0.006$ ) but not after sonorants ( $F(1,4) = 16.66, p = 0.015$ ). These data are in Fig. (2a). For females, the effect of consonant phonation type on H1-A1\* values in vowels was marginal after obstruents ( $F(1,4) = 19.37, p = 0.011$ ) and was not significant after sonorants ( $F(1,4) = 1.35, p = 0.31$ ). For both sexes, then, differences are present after obstruents but not after sonorants.

Sonorants also differ from obstruents in terms of the amount of segment-internal acoustic information they can carry. In this work spectral measures were taken sonorant-internally as well as in vowels, and sonorant-internal measures tend to show a great deal of contextual variation. For example: the omnibus Anova for sonorant-internal H1-A3\* values revealed a main effect of phonation type ( $F(1,7) = 6.59, p = 0.037$ ). Breathiness triggers greater segment-internal H1-A3c values. There is also Phonation Type by Place by Vowel context by Window interaction ( $F(1,7) = 14.73, p = 0.006$ ), however. This type of interaction is difficult to interpret, but Fig. (2b) illustrates the general pattern that presumably underlies the interaction: sonorants before [a]

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<sup>2</sup> Additional data are not discussed here due to space constraints, but see Berkson 2013 for in-depth discussion of the acoustic correlates of breathiness in Marathi sonorants.

pattern in the expected direction, with breathy sonorants associated with greater H1-A3c values than their plain counterparts, but the effect disappears in sonorants that occur before [e].<sup>3</sup>



**Figure (2) Plots for vowel-internal H1-A1c (2a) and sonorant-internal H1-A3\* (2b)**

In sum, while the acoustic correlates of breathy sonorants generally align with those found in obstruents/vowels, acoustic differences triggered by sonorants don't always match up: obstruents sometimes trigger differences that sonorants do not (as illustrated in Fig. 2a). And while sonorants can carry more segment-internal cues than obstruents, these are often subject to contextual variation (as illustrated in Fig. 2b).

Given these findings, there is a question raised as to whether the typological pattern observed—that of breathy sonorants being quite rare—arises at least in part because these sounds are poorly differentiated acoustically. To test this proposal, the perception of phonation contrasts in sonorants and obstruents was investigated.

### 3. Experiment 2: Perception

A perception experiment consisting of a series of ID tasks was conducted next, to determine how well listeners perceive phonation type contrasts in Marathi obstruents and sonorants. Stimuli consisted of CV syllables—dental consonants (/d~/~/d<sup>h</sup>/, /n~/~/n<sup>h</sup>/, /l~/~/l<sup>h</sup>/) paired with [a] and [e]—excised from the real Marathi words recorded in Experiment 1. All 10 talkers from Experiment 1 were used, so stimuli were produced by ten talkers (5 male). Stimuli were presented in consonant-pair blocks (a D block featuring only the /d~/~/d<sup>h</sup>/ contrast, an N block, and an L block) in an experiment built in Paradigm (Perception Research Systems 2007).

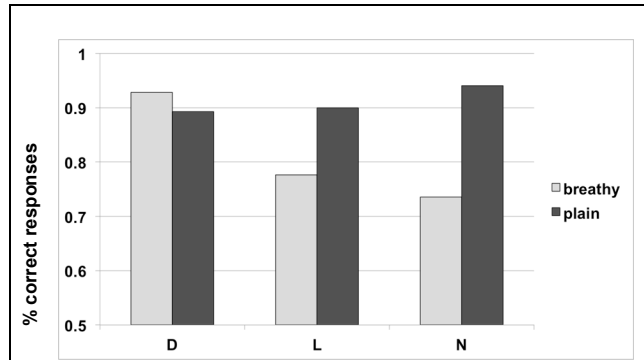
Blocks were randomized. Listeners sat at a computer, heard stimuli presented over headphones, and were asked to identify the consonant they heard by clicking on the appropriate Devanagari character on the screen. Preliminary data from seven native Marathi listeners (four female) reveal that perception of phonation type is more accurate (numerically) for obstruents

<sup>3</sup> Post hoc tests probing the Place and Window interactions are not reported here, but details can be found in Berkson 2013: 168-170. Briefly, the effect size differs across places of articulation and differences are more pronounced later in the sonorant as compared with at the beginning of the sonorant.

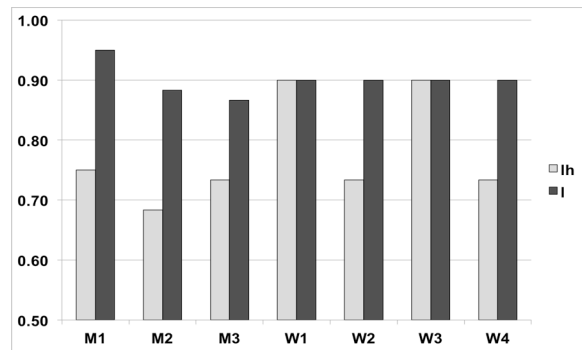
(92%) than for sonorants (82%). Overall accuracy rates for the D, L, and N blocks are in Fig. (3a). Listeners identify plain stimuli with about 90% accuracy. Accuracy remains high for breathy obstruents, but drops by about 20% for breathy sonorants. These data are from just seven participants, but they suggest that phonation contrasts are indeed harder to perceive in sonorants than in obstruents, and that accuracy suffers most in breathy sonorants. Note that in any given trial there are two possible options (plain or breathy), so chance is 50%. Listeners are above chance even with breathy sonorants, but with 75% accuracy they're guessing the wrong consonant one out of four times.

We may wonder: are the group means presented in Fig. (3a) representative of the overall response pattern, or is there individual variation in how good listeners are at this task? In Fig. (3b), we can see the individual response patterns for the seven participants' L block trials. The general trend—of greater accuracy with plain stimuli—holds for five out of seven people, with two female participants (W1 and W3) achieving equal accuracy with plain and breathy stimuli.

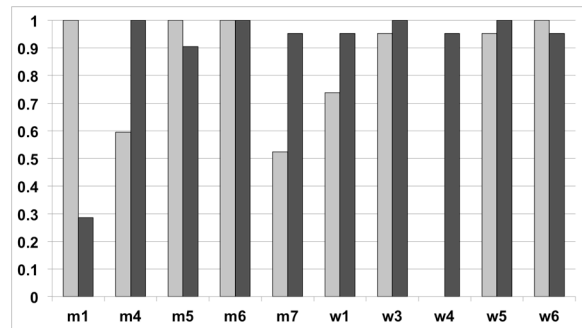
We may also ask whether response rates vary by producer—or, are stimuli produced by certain speakers easier (or more difficult) for listeners to judge? Fig. (3c) shows L response accuracy plotted by talker—by who produced the stimulus—and these data indicate that the answer to this question is a resounding yes. Response rates vary dramatically based on talker. Participants correctly identified the phonation type of L stimuli produced by male talker m6 with 100% accuracy,



**Fig. (3a) Overall response accuracy**  
Response rates for breathy stimuli are in the light bars and for plain stimuli are in the dark bars.



**Fig. (3b) Accuracy by listeners – L Block**  
L results by **listener**—4 males (M1, M2, etc), 3 females. Breathly response accuracy lower, except W1 & W3.



**Fig. (3c) Accuracy by Talkers – L Block**  
L results by the **talker** who produced the tokens. Data for 5 males (m1, m4, etc) & 5 females.

**Figure (3) Perception Accuracy Rates**



for instance, while no listener ever correctly identified one of female talker w4's breathy L stimuli. This was surprising: acoustic analysis of her stimuli reveal that she does produce breathy Ls, which differ along the expected spectral and noise parameters. These acoustic differences do not translate into a perceptually salient difference for listeners, however. They do not identify her breathy L as breathy.

Considering these data together, then, what can we say about the perception of phonation contrasts in Marathi? One point that is made is clear is that the variability is ubiquitous: accuracy varies across sonorant and obstruent contexts, listeners vary in terms of how much their accuracy declines from plain to breathy sonorant contexts, and speakers vary in terms of how perceptibly breathy their breathy sounds are. The indication, though, is that phonation contrasts in sonorants are “vulnerable” in a way that those in obstruents are not—response accuracy declines when the stimuli being judged are breathy sonorants.

If the acoustic cues for phonation contrasts are more variable in sonorants, and perception of breathy sonorants is more vulnerable as well, might there be diachronic consequences? If so, we may expect these sounds to be under-represented in Marathi. We turn now to Experiment 3, which assessed phonemic frequencies in a Marathi corpus to address exactly this question.

#### **4. Experiment 3: Distribution of Breathly Sonorants in a Marathi Corpus**

To investigate the distribution of breathy consonants in the Marathi lexicon, the final experiment investigated phonotactic frequencies in the 2.2 million-word Marathi portion of the EMILLE (Enabling Minority Language Engineering)/CIIL (Central Institute of Indian Languages) corpus. This is a collection of South Asian language corpora totaling 97 million words.<sup>4</sup> The Marathi portion is a written corpus pulled from multiple types of sources (newspapers, magazines, novels, etc.). No spoken corpus of Marathi of comparable size is currently available, and analysis of a written corpus as a first step towards identifying general phonotactic patterns in the language is suitable given that Devanagari is relatively phonetic in nature. Token frequency of consonants (the sheer number of times the phone of interest appears) and type frequency of bigrams (the number of words that contain the targeted bigram) are reported.

The most basic finding, shown in the mosaic plot in Figure (4a), is consonant token frequency: 59% of the consonants in the corpus are obstruents, and 41% are sonorants. Breathly sounds are underrepresented in general: 8% of the consonants in the corpus are breathy, but upwards of 90% of these are obstruents. Just 0.63% of the consonants in the corpus are breathy sonorants.

Recall, too, that not all vowel contexts are created equal: this was evident in Fig. (2b), where sonorant-internal H1-A3\* values differed before [a] but not before [e]. Anecdotally, when culling through dictionaries and working with speakers to generate stimuli for Experiment 1, lexical items containing breathy sonorants before [a] or schwa were the easiest to find. To rigorously probe the question of whether there is a bias towards breathy sonorant-lower vowel sequences in the corpus, type frequency of CV bigrams—meaning the number of words that contain the targeted bigram—was calculated. Data for CV syllables containing monophthongs are in Fig. (4b), and show that breathy sonorants do not co-occur with all monophthongs evenly.

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<sup>4</sup> Details about the corpus—and to fair and appropriate use thereof—can be found at [http://catalog.elra.info/product\\_info.php?products\\_id=696](http://catalog.elra.info/product_info.php?products_id=696).

Rather, they co-occur with [a] more than 60% of the time. Co-occurrence with back rounded [o] and [u] is heavily restricted.

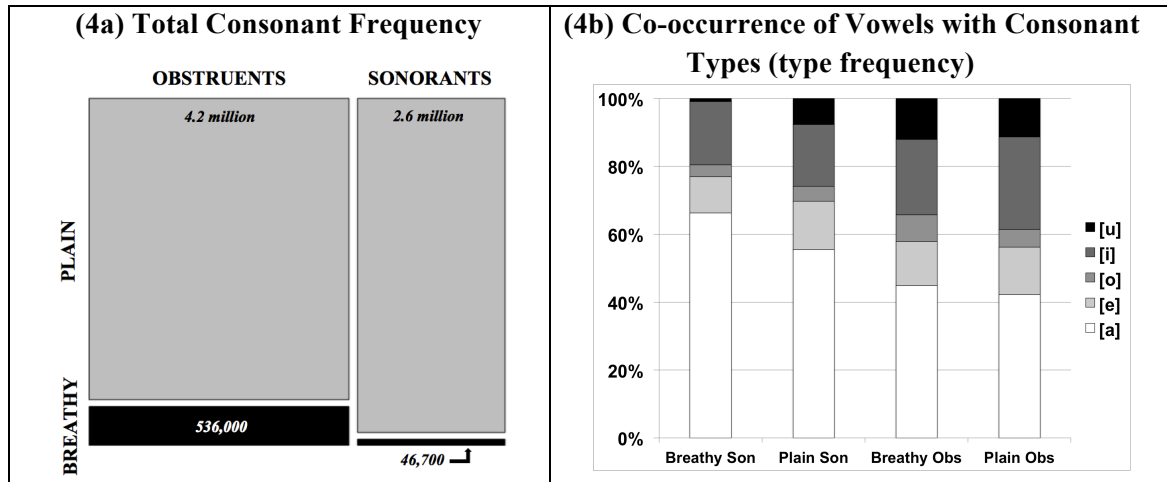


Figure (4) Total consonant frequency (4a) and CV bigram type frequency (4b)

It is important to note that the pattern seen in breathy sonorants does not diverge completely from the pattern evident in the remaining consonant types: the back rounded vowels are infrequent overall, and [a] accounts for a large proportion of CV syllables regardless of consonant type. Nevertheless, [a] dominates the breathy sonorant syllables.

These data represent only an initial foray into understanding the phonotactic frequencies of Marathi. More remains to be examined in the existing corpus—for instance, due to space restrictions only data related to the major groupings of plain obstruent, breathy obstruent, plain sonorant, and breathy sonorant have been reported. No individual consonant data are shown here. Bigram frequencies shared here are limited to those involving monophthongs, but Marathi contains diphthongs, as well. There is also the question of corpus type: future work on a spoken corpus would enhance the generalizability of findings. These provide exciting directions for future work, which can build on the basic picture established here. The present data add to our understanding of breathy sonorants, however, by allowing us to understand their basic distribution within a language which contains them. These sounds, which are typologically rare, are rare in Marathi as well. They are underattested both cross-linguistically and language-internally.

## 5. Discussion

This work focused on phonation type contrasts in sonorants: though crosslinguistically rare, there are a number of breathy voiced sonorant phonemes in Marathi. Three experiments were conducted: one probed the acoustic properties of these sounds, the second the perception of these sounds by native Marathi listeners, and the third their phonotactic frequencies in a Marathi corpus. Each addressed one of the three specific questions laid out in Section 1.3.

The first question asked, **What are the acoustic characteristics of phonation contrasts in sonorants?** The production task confirmed that breathy sonorants are associated with the same

sorts of acoustic patterns found in breathy obstruents and vowels—increased spectral measures and increased noise—but that differences are not triggered as reliably by sonorants as by obstruents. H1-A1\* values in subsequent vowels differ based on obstruent phonation type, for instance, but not based on sonorant phonation type. Furthermore, sonorants can carry segment-internal cues, but these are often subject to contextual variation: recall that sonorant-internal H1-A3\* values differed before [a] but not before [e].

The second question asked, **Are phonation contrasts perceived as well in sonorants as in obstruents?** Preliminary data suggests that the answer is no. Listeners identified obstruent phonation-type with 92% accuracy and sonorant phonation-type with 82% accuracy, and the decrement in sonorants is mainly in the breathy category: plain sonorants are identified more accurately than breathy sonorants, where identification accuracy is around 75%. Importantly, the by-speaker analysis shown in Fig. (3c) indicates a tremendous amount of variation across individual stimuli: while some breathy tokens appear to be easy for listeners to correctly identify, others are tremendously difficult. For one of the talkers who produced stimuli for this experiment, in fact, no breathy stimulus was ever identified correctly. This suggests that breathy voiced sonorants can be produced quite differently, with some productions lending themselves to accurate identification and some being quite confusable with plain sonorants.

The third question asked, **How are breathy sonorants distributed language-internally?** Analysis of a written corpus revealed that breathy sonorants occur infrequently, making up <1% of the consonants in the corpus. They also co-occur with the low vowel [a] more often than with the remaining monophthongs, and co-occur with the back rounded vowels [o] and [u] quite infrequently indeed.

To tie all of these results together, we can again consider the broader point that this research aims to probe: namely, the connection between the crosslinguistic trend and the language-internal reality. By studying Marathi, can we learn something about breathy sonorants that sheds light on the typological pattern? I posit that the answer is yes. Consider the following quote, from Wright (2004):

In an ideal setting, there is no background noise or distractions, and the listener is so riveted by what the talker is saying that he/she gives the signal undivided attention. Under normal conditions it is rare for speech to occur in the absence of at least some form of environmental masking. What this means for speech is that a robustly encoded phonological contrast is more likely to survive signal degradation or interference in reception.... (Wright 2004:42)

We have seen that phonation type contrasts are better differentiated acoustically in obstruent than in sonorant contrasts, and that such contrasts in sonorants are subject to contextual variation. Whether as a direct result of that or due to other factors, phonation contrasts are also perceived more accurately in obstruents than in sonorants. And finally, we have seen underrepresentation of breathy sonorants in a Marathi lexicon. With Wright's quote in mind, we can hypothesize the following: phonation type contrasts in sonorants are phonemic in Marathi, but the sounds themselves are not robustly encoded. The contrasts are vulnerable to the kind of signal degradation that occurs in normal, every day language use. Over time, they are subject to confusability and misperception. The cumulative result of such forces does not benefit breathy

sonorants, either language-internally or cross-linguistically. Perhaps they are not likely to become phonologized in the first place: if they do, they may—for many reasons—be winnowed out of the language over time.

It's important to note that breathy sonorants are not only phonemic in Marathi, but are also included in some very high-frequency function words— [am<sup>h</sup>i] 'we' and [tum<sup>h</sup>i] 'y'all'. Given such items, breathy sonorants are unlikely to disappear from Marathi. Their functional load, however, is not heavy. The forms for *we* and *y'all*, for instance—along with morphologically-related terms—represent the majority of instances of [m<sup>h</sup>] found in the EMILLE corpus. As with any high-frequency items, we may wonder about the acoustic characteristics of these function words in running speech. Is the nasal truly produced with breathiness? Does it look different in casual than in careful speech?

This remains an open question. Other open questions have to do with whether the data presented here are representative: what do breathy sonorants look like in other languages? Are the acoustic, perceptual, and distributional patterns found in Marathi unique, or are they indicative of a larger trend? Similar investigation of breathy sonorants in other languages will shed additional light on the typology of these sounds, and help test the hypothesis supported by the Marathi data presented herein: namely, that phonation type contrasts in sonorants are uncommon because they are not robust.

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# Perception of Breathy Phonation in Gujarati

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## ABSTRACT

The correlates of breathiness are similar across consonants and vowels, raising a question about whether breathy consonant/breathy vowel contrasts are confusable in languages with both, e.g. Gujarati. We investigate the perception of phonemically breathy Cs and Vs in Gujarati via three tasks: free-sort, AX discrimination, and picture-matching identification. Results from six native listeners indicate that breathiness is indeed confusable: participants reliably identify the presence of breathiness if the acoustic correlates thereof are strong enough, but cannot reliably assign it to the appropriate segment (consonant or vowel), rendering it difficult to distinguish C<sup>h</sup>V from CV̥.

## 1. Introduction

Phonation refers to production of sound via vibration of the vocal folds. Different types of phonation are achieved by adjusting the manner of vocal fold vibration; breathy voice, for example, is produced with increased airflow as compared with modal/plain voicing, resulting in increased turbulence/noise in the signal (Bhaskararao & Vuppala 2014, Gordon & Ladefoged 2001, Ladefoged & Maddieson 1996).

In both consonants and vowels, breathy voice is associated with increases in spectral balance and spectral slope, as well as increases in measures of noise (Berkson 2012, Dutta 2007, Esposito 2006, Huffman 1987, Khan 2012, among others). In terms of localization, the acoustic correlates of breathy voiced consonants are housed primarily in the the following vowel (Berkson 2012, Esposito & Khan 2012). A question is therefore raised as to how C<sup>h</sup>V and CV̥ sequences differ from one another. Esposito and Khan (2012) investigated this via acoustic analyses of White Hmong and Gujarati, two languages that contrast breathy consonants and breathy vowels. In both languages, the timing and degree of acoustic difference were found to pattern differently in consonants and vowels: breathy consonants are characterized by a short period of intense breathiness at the onset of the vowel followed by decreasing breathiness, while breathy vowels showed stable (Gujarati) or increasing (White Hmong) breathiness throughout the vowel.

Perceptually, we know that Gujarati speakers can reliably distinguish breathy from modal vowels in Gujarati<sup>1</sup> stimuli (Bickley 1982, Fischer-Jørgensen 1967). But can they leverage the differences in timing and degree of breathiness in C<sup>h</sup>V vs. CV̥ sequences in order to reliably distinguish the two? This is the question addressed herein.

## 2. Methods

This study includes three tasks (free sort, AX discrimination, and picture-matching identification) to investigate the perception of CV, C<sup>h</sup>V, and CV̥ sequences by native Gujarati listeners. Tasks

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<sup>1</sup> Breathiness in Gujarati vary across dialect and register. They may be produced as a disyllabic [əhV] sequence in careful speech (Cardona & Suthar 2003, Khan 2012). Also, some dialects may not have breathy vowels (p.c., Gujarati informants).

were ordered, rather than randomized across participants, because the design of the ID task imposed three experimenter-defined categories on participants. To minimize potential vowel-context or gender effects, stimuli consisted of a well-known minimal triplet (breathy vowel:  $\text{b}\bar{\text{a}}\text{r}$  ‘outside’, breathy consonant:  $\text{b}^{\text{h}}\text{a}\text{r}$  ‘burden’, modal:  $\text{ba}\text{r}$  ‘twelve’) produced by four female native speakers in their 20s.

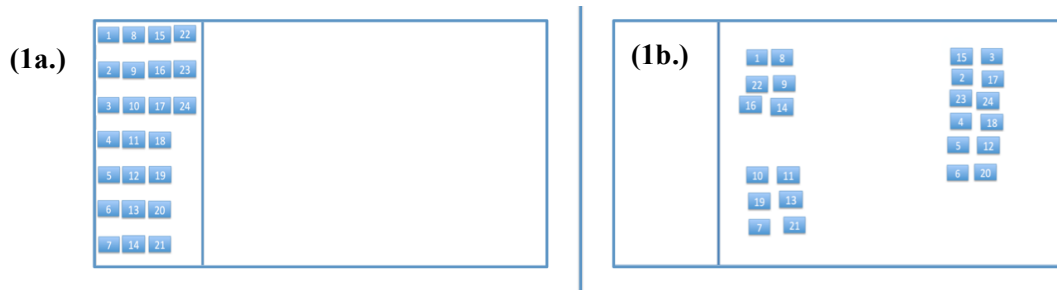
	Gujarati	IPA	Gloss
<b>Breathy Vowel</b>	બહાર	$\text{b}\bar{\text{a}}\text{r}$	‘outside’
<b>Breathy Consonant</b>	બાર	$\text{b}^{\text{h}}\text{a}\text{r}$	‘burden’
<b>Modal</b>	બાર	$\text{ba}\text{r}$	‘twelve’

**Table (1) Stimuli List**

Stimuli were extracted from running speech recorded in Khan (2012) and zero-crossed to maximize naturalness. Two repetitions of each member of the triplet was used, for a total of 24 tokens (3 items X 2 repetitions X 4 speakers). Participants included six native Gujarati listeners, five males in their mid-20s and one 52 yr old female.

### 3. Free Sort Task and Results

The free sort task, which followed the auditory free classification methodology of Clopper (2008), investigated whether listeners independently proposed three target categories ( $[\text{ba}\text{r}]$ ,  $[\text{b}^{\text{h}}\text{a}\text{r}]$ , and  $[\text{b}\bar{\text{a}}\text{r}]$ ) when presented with a screen containing 24 numbered icons arranged in columns (Fig. 1a) and asked to categorize them by dragging them to the right and placing them in groups (see sample outcome in Fig. 1b). Icons corresponded randomly to one of the 24 audio stimuli, and played when clicked.

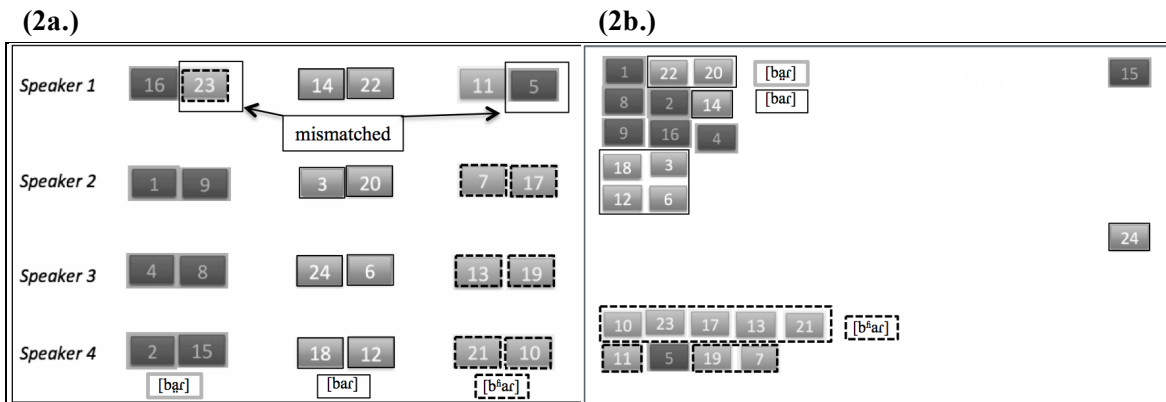


**Figure (1) Free sort task set-up (a) and sample outcome (b)**

To avoid any experimenter-imposed biases, participants had absolute freedom over how to categorize the items and how many categories to propose.

Different approaches to categorization were utilized, and so a purely descriptive report of the outcomes is most informative here. Participants (a) and (b) attempted to pair all stimuli by

both token and speaker, resulting in 12 groups of two (see Figure 2a).<sup>2</sup> Participant (a) was highly accurate in grouping stimuli this way, while Participant (b) was less so. Participants (c) and (d) formed two unique groups, a response pattern illustrated in Fig. (2b). For both, one of the groups represents a well-defined [b<sup>h</sup>ar] category while the other combined [bar] and [b̥ar]. This is of particular interest in light of a note in Fischer-Jørgensen (1967) mentioning that a modal vowel can serve as an acceptable realization of a breathy vowel but the reverse is not true. Participant (e) created three groups which may have been intended to represent the three categories of stimuli: each consisted of a majority of one type of stimuli, but all groups were mixed and contained at least one member of each of the three stimuli types. Even here, however, the most consistently grouped stimuli were breathy consonants—perhaps indicating that these are the least confusable type of stimuli. The responses of participant (f) appeared random, highlighting the problems that can arise in a task with so few guidelines.



**Figure (2)** Recoded outcomes illustrating two response patterns. Two participants grouped by speaker and token-type with relative accuracy (2a), and two created two large groups (2b)—one consisting of breathy consonant items, and one grouping plain tokens and breathy vowel tokens together.

Overall, responses to the free sort task can be divided in three categories: those pairing by token and speaker (a and b), those separating breathy consonants from all other tokens (c and d), and those following less interpretable orders (e and f). Participants (a) and (b) matched tokens from the same speaker with great accuracy, suggesting that they can leverage speaker-specific acoustic information, while the results from (c) and (d) suggest overlap in the modal and breathy vowel categories.

#### 4. Discrimination Task and Results

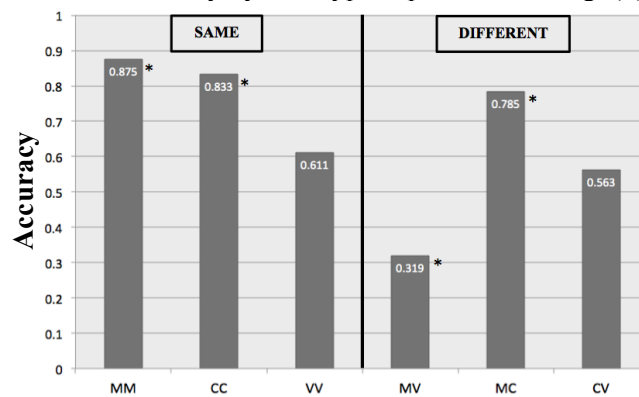
The discrimination task aimed to determine the accuracy with which participants can distinguish pairs of target words. In one sense, it is the task that most directly addresses the issue of perceiving the difference between CV, C<sup>h</sup>V, and CV̥ sequences, because while in other perceptual tasks the participant may categorize stimuli in some way and then compare categories, a

<sup>2</sup> All icons were identical when the participant arranged them, and pairs of icons were distributed randomly throughout the screen, but in Figure (2) icons have been rearranged and re-colored for clarity.



discrimination task encourages participants to compare the stimuli directly (Key 2012). Items were presented in a classic AX task. In the trials, participants heard two of the 24 stimuli in succession and indicated whether the two were ‘same’ or ‘different’. No trial included two words from the same speaker, so there were 54 unique AX pairings. All pairings were played in both orders, for a total of 108 randomly ordered trials. The three categories of stimuli included modal [bar] (henceforth referred to as M), breathy consonant [b<sup>h</sup>ar] (henceforth C), and breathy vowel [b<sup>h</sup>ar] (henceforth V). In some trials the two items were the same, and in some they were different. “Same” trials were of three types (MM, CC, and VV), as were “different” trials (MC, MV, and VC).

Given our main question, the crucial trials are CV (contrasting breathy C [b<sup>h</sup>ar] and breathy V [b<sup>h</sup>ar]), where participant responses can reveal whether the two types of stimuli are reliably distinguished. Overall accuracy by trial-type is presented in Fig. (3).



**Figure (3)** Mean accuracy in AX discrimination. \* = responses significantly different from chance.

To confirm that a contrast is perceptually salient, participants must discriminate stimuli at a rate significantly above chance (in a task with two possible answers, this is 0.5). Chi-squared tests compared the accuracy of each trial type to chance. Participants performed significantly above chance in MM and CC trials ( $p < .0001$ ), and reliably differentiated these two types of tokens as evidenced by their above-chance performance in MC trials ( $p < .0001$ ). However, they were not above chance in the target CV trials, those differentiating [b<sup>h</sup>ar] and [b<sup>h</sup>ar] ( $p = .1136$ ). Breathly V [b<sup>h</sup>ar] stimuli were problematic for listeners in general. In VV trials, participants correctly identified two breathy vowel stimuli as being “the same” with just 61.1% accuracy. This is not above chance ( $p = .0593$ ). In MV trials ([bar] vs. [b<sup>h</sup>ar]), their average accuracy of 31.9% was significantly below chance ( $p < .0001$ ). Rather than correctly distinguishing [bar] and [b<sup>h</sup>ar] as different, participants actively considered them to be the same. Plainly stated, listeners did not reliably consider two breathy vowel stimuli to be the same, and yet actively considered a breathy vowel and a fully modal stimulus to be the same. Recall Fischer-Jørgensen 1967’s comment that a modal vowel can “pass” as a breathy vowel, but not vice versa. The results partially support this, as a modal vowel can pass as a breathy vowel to the extent that a “same” response was preferred in MV trials. What remains confusing, and begs further investigation, is the finding that breathy vowels themselves are not sufficiently alike so as to trigger an above-chance “same” response.

## 5. Identification Task and Results

The identification (ID) task sought to determine overlap between categorization of the target words. Unlike the previous two tasks, the ID task allowed participants to determine whether a stimulus was an acceptable member of an experimenter-defined category. Consider: [bar] might be an acceptable realization of /b̥ar/ ‘outside’ to a participant at least sometimes, but they may still fail to group them together in a free sort task where they can play the tokens repeatedly and deliberate about how to group them, and they may recognize auditory differences between [bar] and [b̥ar] in a discrimination task. In an ID task, however, they may indicate that [bar] can correspond to the meaning ‘outside’.

With the help of a native speaker, pictures representing the three target words were selected. Participants heard an audio stimulus, saw an image representing one of the target words, and indicated whether the two matched. Like the discrimination task, there were “same” and “different” trials: three types of “same” trials, wherein the presented audio and image match, and six types of “different” trials, where they do not.

Average accuracy rates appear in Table (2), where an asterisk indicates a result significantly above or below chance. The trend here is similar to the discrimination task.

		Audio		
		[bar]	[b̥ar]	[b <sup>h</sup> ar]
Image	'twelve'	97.5*	70*	5*
	'outside'	65	62.5	42.5
	'burden'	17.5*	22.5*	70*

**Table (2) Percentage “same” response in ID task.** Shaded cells are those where the audio and picture matched (correct answer: “same”). In unshaded cells, the audio and picture did not match (correct answer: “different”). Thus, greater accuracy is indicated by **high values in shaded boxes** and **low values in unshaded boxes**. Asterisks indicate response rates that differ significantly from chance (0.5).

Listeners accurately identified that the picture and audio stimulus matched in [bar] ‘twelve’ and [b<sup>h</sup>ar] ‘burden’ trials, but—like the AX task—did not perform significantly above chance in identifying that the audio [b̥ar] matched the image for ‘outside’. In fact, participants performed at chance whenever the image for [b̥ar] ‘outside’ was used.

Given the audio stimulus [b̥ar] and the breathy consonant image ‘burden’, listeners identified the mismatch between image and word with above-chance accuracy ( $p = .0114$ ). This indicates that participants identify [b<sup>h</sup>ar] as an acceptable realization of /b̥ar/ ‘outside’. However, they do not do the inverse: [b̥ar] is not an acceptable realization of /b<sup>h</sup>ar/ ‘burden’. We hypothesize that because /b<sup>h</sup>ar/ contains a breathy consonant, only an utterance with sufficiently salient breathiness can pass as a realization of this item.

The complex relationship between modal and breathy vowels is also evident in these data. In both trials with a modal audio stimulus and breathy vowel image, and trials with breathy vowel audio and breathy vowel image, listeners were at chance. They did not know whether the audio and image matched, but rather were guessing. Furthermore, they correctly indicated that the [b̥ar] stimuli did not correspond with the image for [bar] ‘twelve’ only 30% of the time: the remaining 70% of the time, they (incorrectly) indicated that the audio and image matched. This is significantly below chance ( $p = .0114$ ), meaning once again that they weren’t guessing; rather,

they actively indicated that the breathy vowel audio stimuli corresponded with the definition of the modal word.

## 6. Discussion

The primary question driving this research revolves around how well native listeners are able to distinguish between  $C^hV$  and  $CV$  sequences in Gujarati, sequences known to have similar acoustic cues but with differences in degrees and timing (Esposito & Khan 2012). A related issue proposed by Fischer-Jørgensen (1967) was also addressed: the variation that allows for a fully modal production to be accepted as a target breathy vowel.

Two results are important to highlight: (1) the inability of listeners to discriminate between  $[b̥ar]$  and  $[b^h ar]$  significantly above chance; and (2), the inability of listeners to reliably identify that  $[b^h ar]$  does not correspond with the image for ‘outside’ ( $[b̥ ar]$ ). Both suggest that  $C^hV$  and  $CV$  sequences are not reliably differentiated by listeners.

The discrimination task most directly addressed the salience of the difference between any two categories. Ideally, presentation of two audio stimuli in immediate succession causes participants to compare the acoustic properties of the stimuli without categorizing them (Key 2012), and the findings presented here for listeners of Gujarati indeed strongly suggest that the acoustic differences between  $C^hV$  and  $CV$  sequences are not sufficiently robust. When presented with a trial pairing a breathy  $C^h$  and a breathy  $V$  stimulus, listeners responded with “different” just 56% of the time, meaning that they were at chance: they could not accurately distinguish the two stimuli as being different.

Similarly, in the identification task, participants did not reliably indicate the mismatch between a  $[b^h ar]$  audio stimulus and a  $[b̥ ar]$  ‘outside’ image. Again, they performed at chance. In the inverse type of trial, however, in which the  $[b̥ ar]$  audio was paired with the  $[b^h ar]$  ‘burden’ image, participants reliably indicated the mismatch. In other words, participants were willing to identify  $[C^hV]$  as a realization of  $/CV/$ , but not willing to identify  $[CV]$  as a realization of  $/C^hV/$ . This raises the possibility that there is ambiguity in the robust breathiness associated with consonants: listeners recognize the breathiness in  $[b^h ar]$  stimuli, but are willing to assign it to either the consonant or the vowel. Thus, it is deemed acceptable as a realization of either  $/b^h ar/$  or  $/b̥ ar/$ . This too supports the hypothesis that the two types of breathy stimuli are not well distinguished.

Recall that listeners performed at chance when provided with a matched breathy  $V$  audio and image pair in the ID task, and when presented with two breathy  $V$  stimuli in the AX discrimination task. This raises the possibility that the breathiness associated with vowels is variable in a way that consonant breathiness is not: listeners do not reliably identify the breathy nature of the breathy vowel stimulus, and are therefore unwilling to consider it a realization of something that should have salient breathiness, namely  $/b^h/$ .

The story, then, is that this confusion runs in only one direction:  $[b^h ar]$  can be mistaken for  $/b̥ ar/$ , but the reverse is not true. Furthermore, participants have a tendency to allow  $[b̥ ar]$  stimuli to serve as acceptable realizations of  $/bar/$ . This may shed light on the reason  $[b̥ ar]$  is so rarely mistaken for  $/b^h ar/$ : the breathiness in  $[b̥ ar]$  is subtle enough to pass for a fully modal  $/bar/$ , and not robust enough to pass for breathy consonant  $/b^h ar/$ .

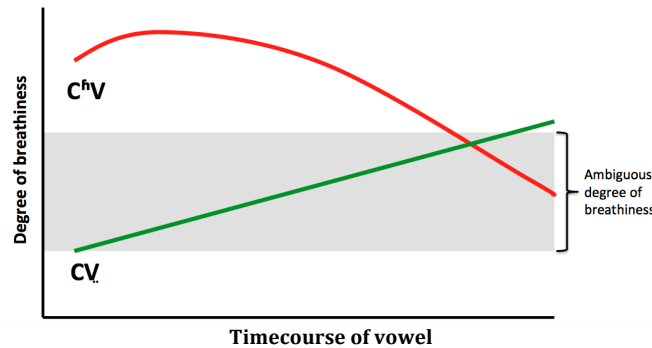
The idea that a modal sequence  $[CV]$  may serve as an acceptable realization of a breathy vowel  $/CV/$  but that a breathy vowel  $[CV]$  is not an acceptable realization of modal  $/CV/$  was

initially proposed by Fischer-Jørgensen (1967), and the results of this experiment support this claim. The free sort results, for instance, indicate that there is an increased probability of overlap between [b̥ar] and [bar], which some speakers put together in a single group, while the tendency for [b<sup>h</sup>ar] to remain distinct. This was true across the different response patterns exhibited by our participants. In the discrimination task, participants performed at a rate significantly below chance in trials involving a modal stimulus and breathy vowel, indicating that participants reliably consider breathy vowel stimuli and modal stimuli to represent the same word. They're not guessing; they're actively calling the two "the same". Under the hypothesis that [bar] can serve as a realization of /b̥ar/, participants may reliably hear the difference between stimuli of each type yet consider them two acceptable variants of the same word.

Participants also performed significantly below chance when identifying that a breathy vowel stimulus, [b̥ar], does not correspond with the picture for the fully modal 'twelve', and they could not accurately identify that [b̥ar] corresponds with picture for the breathy V 'outside.' Participants were not inaccurate at correctly identifying breathy vowels, in other words; they were accurate at misidentifying them as modal stimuli. This indicates that the degree of breathiness in [b̥ar] stimuli was not sufficiently salient.

For the results of the ID task to be consistent with the hypothesis that /CV/ can be realized as [CV], but /CV/ cannot be realized as [CV̥], participants should identify modal [bar] stimuli as corresponding with the images representing both /bar/ 'twelve' and /b̥ar/ 'outside'. The results align with this expectation. One would also expect salient breathiness in the stimulus to prevent participants from incorrectly identifying a stimulus as modal, and this too is borne out in both the discrimination tasks and the ID task. Listeners identified that audio stimuli of fully modal [bar] and breathy consonant [b<sup>h</sup>ar] were different 79% of the time, and noted the mismatch between a breathy consonant [b<sup>h</sup>ar] audio and the picture for modal /bar/ 'twelve' 95% of the time.

A potential explanation for the trends seen here is that the differences between C<sup>h</sup>V and CV̥ sequences are not robust enough to be perceptually salient, because breathy vowels are inadequately cued. We propose that breathiness functions no differently from other continuous variables that are perceived categorically. For example, the perception of VOT in English is not completely categorical; there is a window of ambiguity in which an alveolar stop can be perceived as either a /t/ or a /d/ (Eimas & Corbit 1973, among others). The perception of breathiness can be thought of similarly but with a suite of continuous variables representing spectral tilt, spectral balance, and noise. If the strength of the acoustic cues for breathy vowels lies near the perceptual threshold between breathiness and modality but those for breathy consonants do not, the breathiness of C<sup>h</sup>V stimuli should be easily identifiable while that of CV̥ stimuli should be more ambiguous. Consistent with the data, listeners who are sensitive to cues in degree of breathiness in C<sup>h</sup>V sequences but not to cues in its timing would be able to correctly identify a sequence as breathy but not be able to reliably categorize it as either C<sup>h</sup>V or CV̥. Similarly, if cues to the degree of breathiness of a CV̥ sequence are insufficient to determine with certainty that the stimulus is breathy, then that sequence would be incorrectly categorized as CV. A schematization of this proposal appears in Figure (4), in which the vowel after C<sup>h</sup> is represented with intense breathiness at first before a gradual decrease, and V̥ is represented with more moderate, increasing breathiness. The breathiness associated with C<sup>h</sup> falls outside the zone of ambiguity, while the breathiness of V̥ does not.



**Figure (4) Schematization of degree of breathiness across timecourse of vowel**

In the scenario proposed by this explanation, listeners are sensitive to the presence or absence of breathiness. Significant indication of breathiness may be sufficient cause for excluding a stimulus from being modal, but insufficient cause for determining if the breathiness is associated with the consonant or vowel. The results of the present study align with this interpretation, and strongly suggest that it merits further investigation.

## 6. Conclusion

This study investigated the perception of C<sup>h</sup>V, CṾ, and CV sequences by native listeners of Gujarati. Participants reliably recognize the presence of breathiness in C<sup>h</sup>V sequences, but are not necessarily capable of determining whether that breathiness is associated with the vowel or consonant. They do not reliably recognize the presence of breathiness in CṾ sequences, however, often indicating them to be the same as or an acceptable realization of a modal CV sequence. The overarching trend, then, is that C<sup>h</sup>V can be perceived as either C<sup>h</sup>V or CṾ, and CṾ is often indistinguishable from CV. While ongoing work will further explore the specifics of these trends, it is evident from this study that there is a problem in differentiating C<sup>h</sup>V and CṾ sequences as well as an overlap in either the categorization or perception of CṾ and CV.

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# The intonation of South Asian languages: towards a comparative analysis

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## ABSTRACT

South Asia has long been considered a region of widespread convergence in phonology, morphology, and syntax. While these claims have not explicitly been extended to intonation in previous work, researchers such as Féry (2010) have suggested that multiple South Asian languages (SALs) from different families can be covered with the same intonational description, and that prominence and weight play no role in its implementation. The current study examines what is arguably the most characteristic unit of SAL prosody, the repeated rising contour (RRC), produced in recordings of *The North Wind and the Sun* in six SALs to confirm the existence of some crosslinguistic similarities while also identifying areas of substantial variation. I highlight the roles played by lexical accent, vowel peripherality, and vowel length in the alignment of tones, and describe variation within and across languages. I also suggest directions in which research must be carried out to expand our typological understanding of the region and propose a model flexible enough to cover its diverse languages.

## 1 Introduction

Since Emeneau's (1956) characterization of South Asia as a "linguistic area", a region of linguistic convergence across language families, researchers have identified numerous phonological, morphological, and syntactic properties that appear again and again across the Subcontinent. Typical South Asian languages (SALs) have a series of retroflex consonants, a productive process of echo reduplication in their phonology, a lack of prefixes in the inflectional morphology, subject-object-verb (SOV) word order, the use of non-nominative case marking for experiencer subjects, etc.

But of course, South Asia is massively diverse in number of languages (and dialects of those languages), falling into five large families — the Indic (a.k.a. Indo-Aryan) and Nuristani branches of Indo-Iranian, itself a branch of Indo-European; the entire Dravidian family; the Khasic, Munda, and Nicobarese branches of Austroasiatic; numerous branches of Tibeto-Burman; and a handful of languages of the Southwestern Tai branch of Tai-Kadai — as well as some smaller families (e.g. Andamanese), isolates (e.g. Burushaski), and yet-unclassified languages (e.g. Majhwar).

Thus, as more data from more languages are examined, claims of crosslinguistic homogeneity become more nuanced, often showing geographically-based subpatterns that occasionally cross language families (Subbārão 2012). For example, the prevalence of retroflex consonants is heavily attenuated as one moves east, with Tibeto-Burman languages and the neighboring Indic language Assamese generally lacking this place of articulation. Inflectional prefixes, while rare in most South Asian languages, are frequent in Khasic. Kashmiri's verb-second pattern serves as a notable exception to the regionally dominant SOV pattern. And while experiencer subjects (e.g. 'Ram is hungry') do take non-nominative case marking in most SALs (with the exception of Khasic and many Tibeto-Burman languages), the choice of case varies geographically, with most languages (i.e. all Dravidian and Munda languages, and most Indic languages) opting for dative-accusative case while eastern languages (i.e. Assamese, Bengali, and Oriya of the Indic family; Bodo and Kokborok of the Tibeto-Burman family) use genitive marking.

The question underlying the current study is whether this prevalence of crosslinguistic (but geographically variable) properties of linguistic convergence in South Asia extends to intonation, i.e. **is there a "typical intonation" for SALs?** And if so, **what are the exceptions and regional patterns?**

For those unfamiliar with SAL intonation, one might ask, why is the intonation of SALs interesting? Traditional accounts might suggest that SAL intonation is relatively unconstrained by the kinds of prosodic complexities seen in better-studied languages. For example, unlike most of the languages west of the region (e.g. Arabic, English, Spanish), SALs are generally considered to have no lexical contrast in prominence ("stress") placement, and there are in fact no clear signs that stress is even a phonetic property of SALs at all. And unlike most of the languages north and east of the region (e.g.

Burmese, Thai, Chinese languages), most SALs have no lexical contrast in tone, with notable exceptions (e.g. Punjabi and the Tibeto-Burman languages). This may lead one to imagine that SAL intonation should be more vulnerable to phonetic and phonological effects of the segments, or to stylistic variation.

Somewhat surprisingly, though, traditional accounts suggest that SAL intonation is in fact strikingly uniform, supporting the idea that South Asia is a region of extreme linguistic convergence, even in intonation. An identical pattern is described across speakers, languages, and language families, consisting of repeating rising contours (RRCs) built from L tones on the left edge and H tones on the right edge of each content word, followed by a final boundary tone marking the edge of the intonation phrase (IP). This suggests strict rules of tone alignment and no space for variation.

The current study examines RRCs in a small controlled sample of recordings in six SALs from two families — Assamese, Bengali, Hindi, and Nepali of the Indic family and Tamil and Telugu from the Dravidian family — to challenge the assertion that one model can adequately describe diverse SALs. While recognizing the existence of some shared intonational properties (supporting a weak claim of the existence of a “typical” SAL intonation), I highlight the major areas of variation within and across SALs. Some of these language-specific properties in intonation can be seen as deriving from language-specific properties in syllable structure and weight assessment — e.g. the role of vowel peripherality in attracting L tones in Hindi, the role of contrastive vowel length in the alignment of H tones Telugu, and the lack of these weight-sensitive tonal attraction properties in Assamese, Bengali, and Nepali. Other areas of variation within and across languages — e.g. pitch accent alignment in Assamese, prevalence of pitch accent raising after voiceless onsets — cannot always be tied to features external to the intonation, and thus simply have to be incorporated as independent areas of variation.

The paper is divided as followed: §2 summarizes what is currently known about SAL intonation, especially from a comparative perspective, §3 introduces the methodology of the current study while §4 reports its results, and §5 concludes with future directions.

## **2 Background**

The existing literature on the intonation of SALs only scratches the surface of the region, with most empirical work concentrating on Assamese, Bengali, Hindi, and Tamil. Moreover, even within this subset of languages, major inconsistencies arise in the analyses of everything from the presence of lexical prominence/accent (§2.1), to the alignment and number of tonal targets in the pitch contour (§2.2–§2.4).

### **2.1 Prominence/accent, a.k.a. “stress”**

Ladd’s (1996) typology of prominence marking classifies languages that phonologically favor one syllable (or mora) over the others within a word, i.e. those that mark one syllable/mora as “accented” or “prominent”. This phonological favoritism can manifest itself in many ways, and often can also carry overt phonetic marking as well via stress and/or pitch contour. For example, “stress-accent languages” (e.g. English, Italian, etc.) mark their prominent syllables with correlates of stress, whereas “pitch-accent languages” such as (Tokyo) Japanese mark their prominent syllables with a particular pitch contour. A third category marks prominent syllables with both stress and a specific pitch contour; such languages include Swedish, Latvian, etc., and are also often called “pitch-accent languages” while Ladd calls them “stress-accent languages” with “lexical pitch”. Lastly, a fourth category marks prominent syllables with neither stress nor specific pitch contour; Ladd identifies “Bengali (and probably most of the languages of India)” as representing “non-stress accent” with “postlexical pitch only”. Ultimately, what this means is that prominent syllables in SALs should not be expected to have the overt signs of phonetic marking such as stress or lexically-specified pitch contour. Instead, we can look at other areas of phonetics and phonology, such as contrast preservation, resistance to reduction, and intonational pitch accent location.

Many SALs are described as having a fixed word-initial accent assignment (often ambiguously called in “stress assignment”) pattern. Keane (2014) summarizes extensive phonological and phonetic evidence from Tamil. Like other Dravidian languages, Tamil has a fully balanced contrast of short /i e a o



u/ and long vowels /i: e: a: o: u:/. However, for the mid vowels, this contrast is only found in word-initial syllables, e.g. /oʈ:u/ ‘stick’ vs. /o:ʈ:u/ ‘drive’ (Asher & Keane 2005). In all other positions, mid vowels cannot contrast in length, and are uniformly long, e.g. /maran̄ɔ:m/ ‘we forgot’ but \*/maran̄ɔm/. In addition, while initial syllables can host coda nasals that disagree in place with the following consonant (e.g. /anpu/ ‘love’), nasal place assimilation is obligatory elsewhere (Christdas 1988), revealing a preservation of the place contrast in initial syllables. Lastly, Keane (2003) presents evidence of phonetic reduction in non-initial syllables that resembles the kind seen in unstressed syllables in stress-accent languages; short vowels /i u a/ are centralized in non-initial position to [i ʊ ə].

Similarly in Bengali, Dasgupta (2003) and Khan (2008) report that the contrast between tense /e o/ and lax /ɛ ɔ/ mid vowels (e.g. ʈɛkʰe/ ‘see-3’ vs. /ʈɛkʰe/ ‘see-PRF’; /hoʈo/ ‘casualties’ vs. /hoʈo/ ‘happen-HAB-3’) is neutralized to the tense variants /e o/ in non-initial position (e.g. \*/ʈɛkʰɛ/, \*/ʈɛkʰe/, \*/hoʈɔ/, \*/hoʈɔ/). This can produce alternations, e.g. /ɔn-/ ‘NEG’ + /ɛk/ ‘one’ → /ɔnek/ ‘many’. A similar neutralization occurs in oral vs. nasal vowels (Dasgupta 2003, Khan 2008), e.g. /hãte/ ‘walk-3’ vs. /hate/ ‘market-LOC’, as nasal vowels only occur initially, i.e. \*/hatẽ/, \*/hãtẽ/, even leading to historical shifts of non-initial nasals to initial nasalization, e.g. /ã:io/ < *ãmiya* ‘relatives’. A handful of loans also show truncation of initial syllables that are unaccented in the donor language, maintaining initial accent while remaining faithful to the donor language’s accentuation pattern, e.g. /maɪkin/ < English [əˈmeɪɪkɪn] ‘American’, /sɫam(a)likum/ < Arabic /asːaˈla:mu ʕaˈlajkum/ ‘(Muslim greeting)’ (Khan 2008).

Unlike the systems described above, some SALs have been described as having weight-sensitive prominence assignment patterns, in which a fixed syllable is prominent unless a heavier syllable attracts prominence. In Hindi-Urdu-type weight sensitivity (Hussain 1997), syllable weight (as measured in moras) can be increased with the presence of peripheral (or “long”) vowels /i e ɛ a ɔ o u/ rather than centralized (or “short”) vowels /ɪ ə ʊ/ and/or with the addition of coda consonants (with the added stipulation that the final mora is extrametrical) e.g. /kʊˈʈɔl/ ‘pickaxe’ vs. /ˈbɔhɔɾ/ ‘outside’ vs. /ˈtʃɔpkɔɾɪʃ/ ‘altercation’ (using the IPA transcription of Ohala 1999); otherwise, the accent is penultimate, e.g. /ˈbɔɾa/ ‘bad’. In Assamese-type weight sensitivity (Mahanta 2001), initial syllables are accented unless they are open (light) and followed by a closed (heavy) syllable, which then takes the accent, e.g. /ˈɾati/ ‘night’ vs. /baˈgan/ ‘garden’ (using the IPA transcription of Mahanta 2012).

Thus, we have evidence that SALs have prominent syllables, despite the lack of overt phonetic correlates of stress. Crucially, these prominent syllables (generally) attract the low (L) target of the postlexical pitch accents L\* and L\*+H, as discussed below.

## 2.2 Repeating rising contours (RRCs)

The most widely cited observation suggesting an intonational system common to SALs is the sequence of rising contours identified here as repeated rising contours (RRCs), to remain theory-neutral for the moment. Each of these rises roughly corresponds to a content word plus surrounding functional material. The prosodic unit corresponding to this rise is called an Accentual Phrase (AP, strictly the domain of a single pitch accent) in Khan (2008/2014) for Bangladeshi Bengali and Keane (2014) for Tamil and a Phonological Phrase (P-phrase, strictly the domain of certain phonological process) in Hayes & Lahiri (1991) and subsequent work by others on Kolkata Bengali, Twaha & Mahanta (2016) for Assamese, and Féry’s (2010) comparative work. In the current paper, I use the term AP.

In Assamese and Kolkata Bengali, this right-boundary alignment has been found to be so consistent that the H tone is described as a reliable indicator of the edges of domains for segmental processes (Hayes & Lahiri 1991, Twaha & Mahanta 2016) and the disambiguation of syntactic structure (Lahiri & Fitzpatrick-Cole 1999). However, as mentioned in more detail in §2.4 below, the H tone of the RRC is often described as occurring well before the expected location, often just one or two syllables from the L tone, and several syllables away from the word’s (and thus the phrase’s) right edge.

## 2.3 Previous comparative work

Thus far, little comparative work has been carried out in this area, with the occasional study comparing the intonational properties of two languages (e.g. Bengali and Hindi, Choudhury 2015). The common theme underlying existing comparative work is that SALs all have remarkably similar intonation, the most explicit claim of which is Féry's (2010) description of Bengali, Hindi, Malayalam, and Tamil. Based on her analysis of the RRCs in her recordings, she concludes that (at least these four) SALs are effectively identical in their intonation, and can be captured with a single model with no evidence of variation within or across languages. Specifically, she claims that IPs in these four SALs are divided into P-phrases (roughly one per content word, functionally equivalent to an AP), with all non-final P-phrases marked on the left with a  $L_P$  boundary tone, and on the right with a  $Ha$  boundary tone. There are no pitch accents, and thus prominence plays no role in intonation.

## 2.4 Inconsistencies

Some of the claims in previous comparative work stand in contrast to previous descriptions on the individual languages studied. For example, previous work on Bengali (Hayes & Lahiri 1991, Khan 2008/2014) suggests that the  $L$  tone beginning each RRC is a pitch accent ( $L^*$ ), not a left boundary tone ( $L_P$ ). The same is tentatively claimed for Tamil by Keane (2014). More notably, Sengar & Mannell (2012) and Harnsberger (1994) show that in Hindi, the  $L$  target can be borne on a non-initial syllable predicted by syllable weight to be prominent/accented, more strongly supporting a pitch accent analysis.

Similarly, most previous accounts of SALs as well as previous comparative work describe strict right-boundary alignment of the  $H$  tone (Genzel 2007), transcribed  $Ha$  for models assuming APs and  $H_P$  for models assuming P-phrases. However, researchers occasionally mention that this  $H$  inexplicably appears early, typically during the syllable following the prominence, regardless of the length of the word. Keane (2014) discusses the possibility that the  $H$  tone might not be a boundary tone at all, rather it could be the trailing target of a complex pitch accent, i.e.  $L^*+H$ , where the  $H$  target appears some fixed distance after the prominent syllable, which bears the  $L^*$ . Ultimately, she finds that the alignment of the  $H$  tone can be significantly correlated to the location of the phrase's right edge as well as the location of the prominent syllable, and thus it is not entirely clear whether the  $H$  is a head-marking tone or an edge-marking tone. Additionally, Keane describes instances where there are two  $H$  targets within a word, suggesting an even more complex structure. My previous work on Bangladeshi Bengali (Khan 2008/2014) proposes that both complex pitch accent ( $L^*+H$ ) and boundary tone ( $L^*...Ha$ ) options are available, while the boundary tone option is far more common and variation from it can be partially predicted by information structure (e.g. the salience of the IP-final phrase).

## 3 Current study: motivation and methods

Given the inconsistencies in the descriptions of even the most basic and most widely-cited characteristic of SAL intonation, i.e. the RRC, the current study focuses on this fundamental part of the prosodic system to look for crosslinguistic similarities and variations in tonal alignment and realization.

To test the applicability of a single model of intonation for diverse SALs, the current study introduces comparative work in progress, based on two corpora: (1) recordings of the *North Wind and Sun* fable as recorded by one speaker per language in *JIPA* illustrations of six SALs: **Assamese** (Mahanta 2012), **Bengali** (Khan 2010), **Hindi** (Ohala 1999), **Nepali** (Khatiwada 2009), **Telugu** (Bhaskararao & Ray 2016), and **Tamil** (Keane 2004), and (2) the example recordings provided as supplementary materials for the chapters on Bengali (Khan 2014) and Tamil (Keane 2014) in *Prosodic Typology II* (Jun 2014). Note that the languages studied here are a superset of those studied in previous comparative work.

For crosslinguistic transparency, all recordings were transcribed with a single set of criteria, based on the conventions of B-ToBI (Khan 2008/2014). This way, differences between languages should not be artificially created through differences in how phenomena are transcribed (e.g.  $Ha$  vs.  $H_P$ ), rather they should reflect intonational phonologically-relevant differences, i.e. those involving the number,

alignment, and relative height of tones. As the reader will surely note, adaptations had to be made to B-ToBI to capture other languages, and those differences will be highlighted as they are reported.<sup>1</sup>

Examples of RRCs from the six SALs, transcribed in the proposed annotation system adapted from B-ToBI, are given in Figures 1–6.

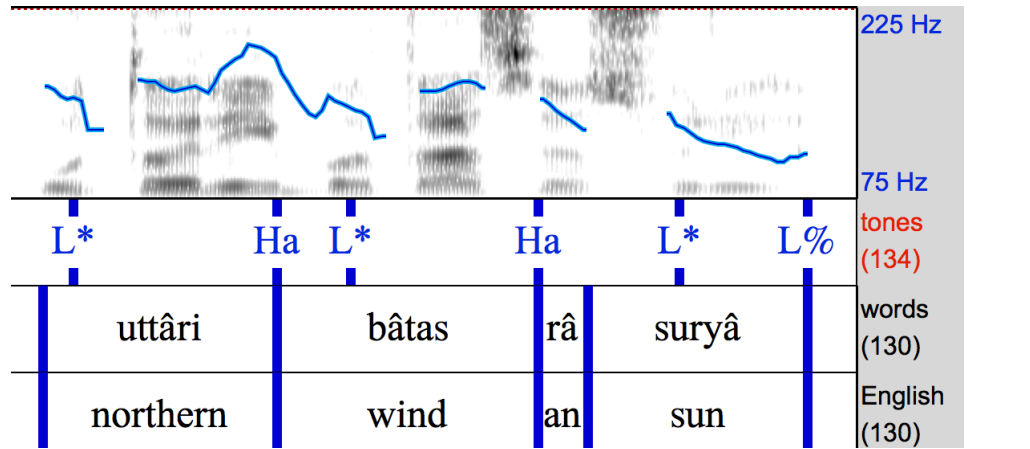


Figure 1. Two RRCs in Nepali. /uttâri bâtas râ surjâ/ ‘The North Wind and the Sun.’

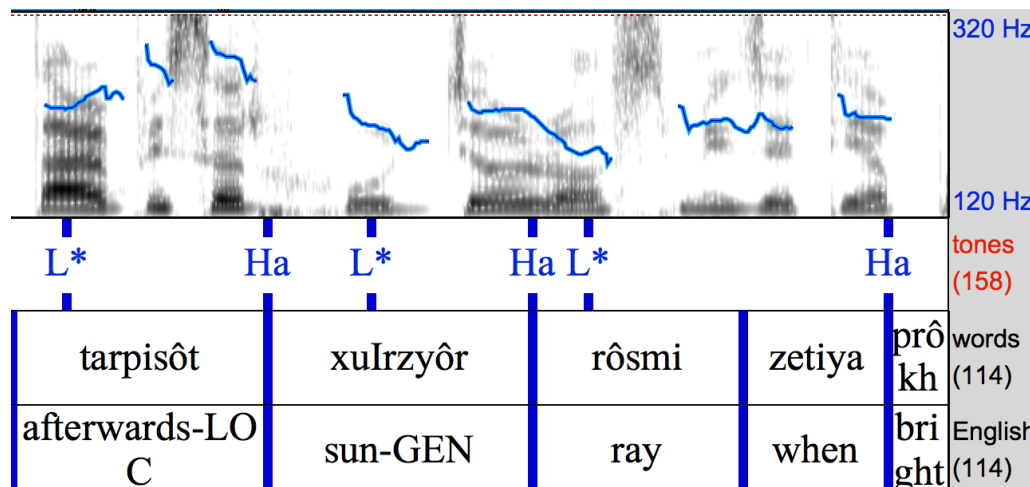


Figure 2. Three RRCs in Assamese. /tarpisôt xurzyôr rôsmi zetiya/ ‘Afterwards, when the Sun’s rays...’. Each RRC would be transcribed L\*...H<sub>p</sub> in Twaha & Mahanta (2016).

<sup>1</sup> For current purposes, APs can be thought of as functionally equivalent to P-phrases, and thus Ha, La, and LHa can be seen as equivalent to H<sub>p</sub>, L<sub>p</sub>, and LH<sub>p</sub>, respectively. IPA transcriptions of SALs are based on *JIPA* illustrations, i.e. Mahanta (2012) for Assamese, Khan (2010) for Bengali, Ohala (1999) for Hindi, Khatiwada (2009) for Nepali, Keane (2004) for Tamil, and Bhaskararao & Ray (2016, in press) for Telugu. Examples recordings come from these illustrations unless otherwise noted.

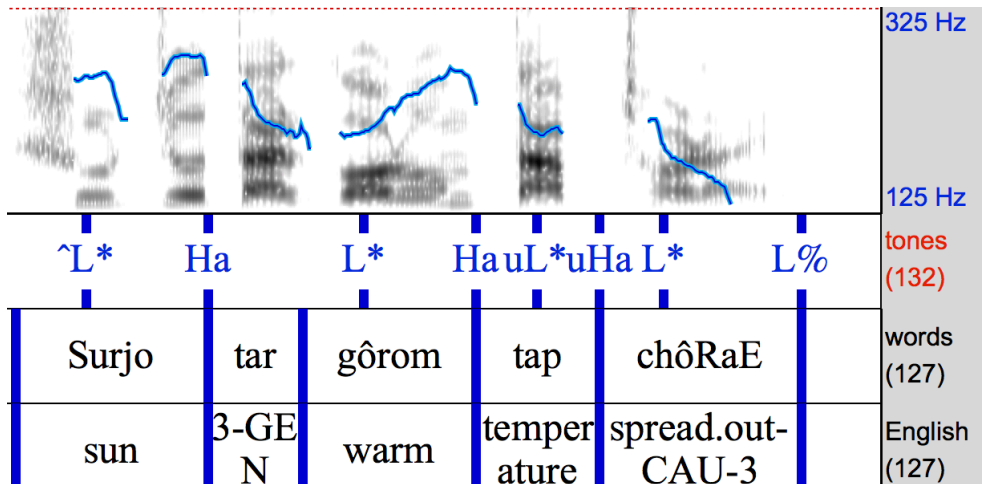


Figure 3. Three RRCs in Bengali. /ʃuɹdʒo ʈaɪ gɔɹom ʈap te<sup>h</sup>ɔɹæ/ ‘The Sun spread out his/her warmth.’

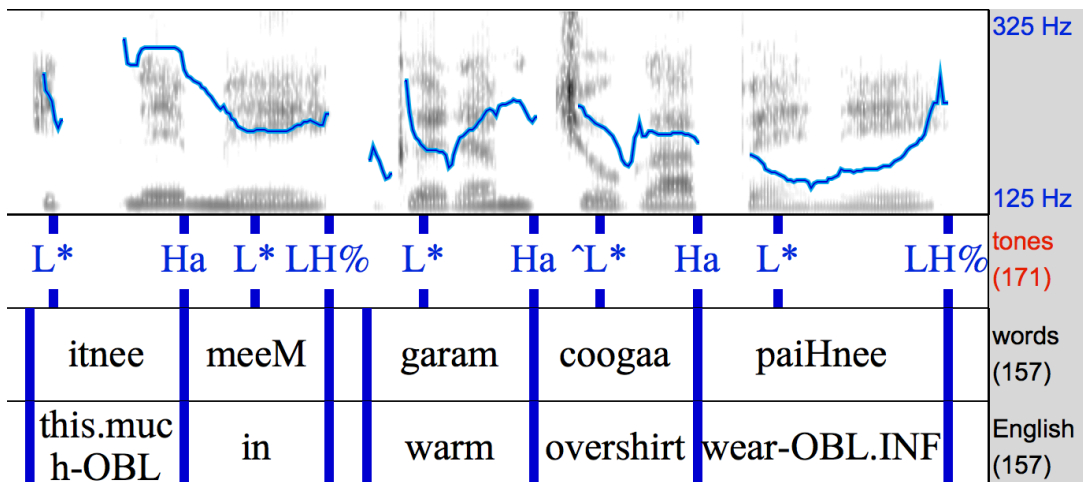


Figure 4. Three RRCs in Hindi. /itne mē gəɹəm ʈoɡə pəhne/ ‘During this, a warm cloak-wearing...’. Each RRC would be transcribed LH in Harnsberger (1996) and L\*...H<sub>p</sub> in Patil et al. (2008).

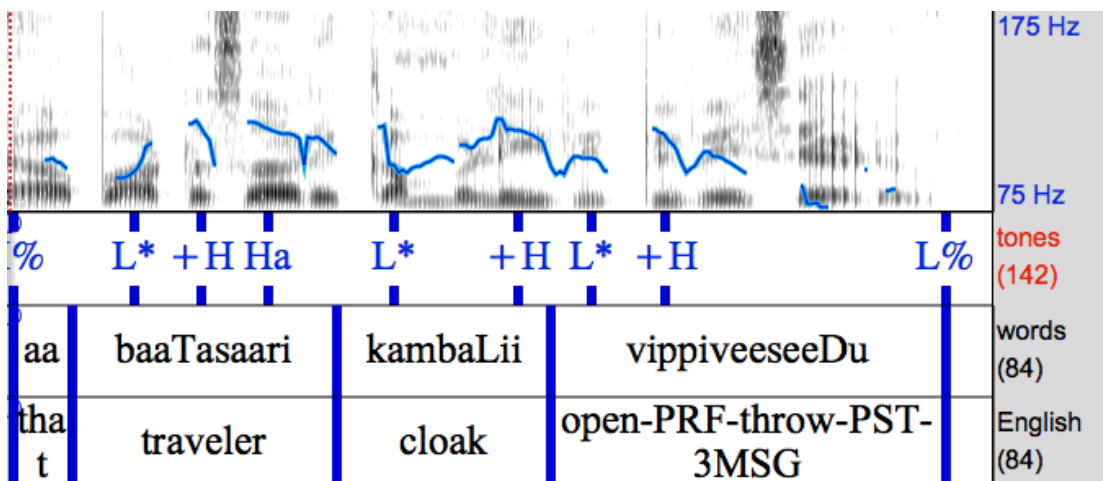


Figure 5. Two RRCs in Telugu. /ɛ: bə:ʈəsə:ri kəmbəli: vippive:se:ɖu/ ‘The traveler threw off (his) cloak.’

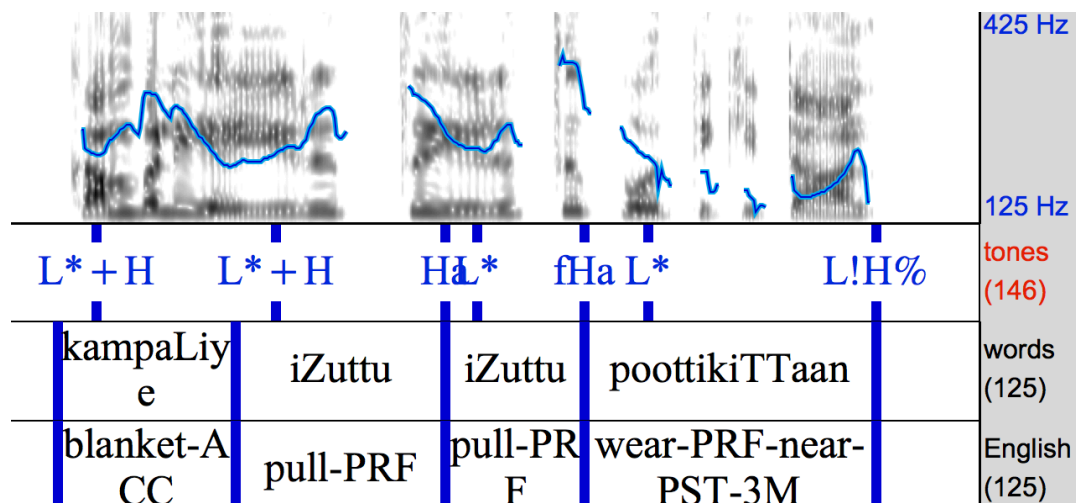


Figure 6. Three RRCs in Tamil. /kampa<sup>l</sup>i<sup>e</sup> i<sup>z</sup>uttu i<sup>z</sup>uttu po<sup>t</sup>ti<sup>k</sup>i<sup>t</sup>ta<sup>n</sup>/ ‘...kept pulling the blanket more tightly.’ Each RRC would be transcribed L\*...H in Keane (2014).

## 4 Results

From the intonational transcriptions analyzed for the current study, I propose a much weaker version of the claim that there is a “typical” intonation for SALs. Indeed, most SALs do share some basic prosodic traits, as previously claimed. However, even within the realm of the characteristic RRCs, there are at least three crucial areas of language-specific and language-internal variation that have not properly been addressed in previous comparative work: L tone alignment, H tone alignment (and number of H tones per RRC), and L tone raising, each of which is described in detail below. (This list does not include other areas of variation that go beyond the scope of this paper, e.g. focus prosody, IP boundary tone inventory.)

### 4.1 Alignment of L tone: Rightward shift

The alignment of the L target beginning each RRC is generally on the word-initial syllable, aligning with descriptions of fixed prominence location in most SALs. This motivates a transcription that incorporates the asterisk representing prominence: L\*. Fixed word-initial alignment of L\* could be considered the “typical” case for SALs, and it is the only such alignment observed in Bengali, Nepali, Tamil, and Telugu. For Hindi and Assamese, however, L\* can shift rightward.

In Hindi, rightward shift of L\* occurs when the prominent syllable (as predicted by Hussain 1997) is non-initial. In such cases, the L\* consistently appears on the prominence (Figure 7). Examples of rightward shift in Hindi strongly support the claim that the AP’s L target marks prominence, i.e. it is a pitch accent rather than a boundary tone (Dyrud 2001, Genzel 2007, Patil et al. 2008), contra Féry (2010), who claims the L tone is strictly phrase-initial and not drawn to prominence.

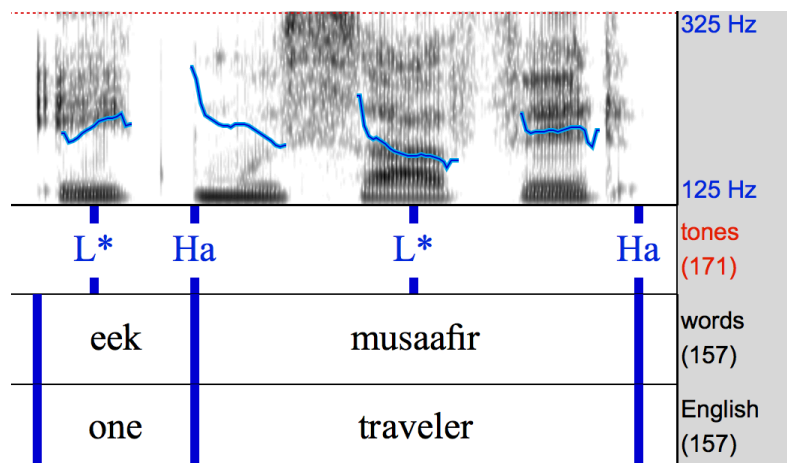


Figure 7. Rightward shift of L\* in Hindi maintains the L target on the prominent non-initial syllable on /mʊ'safir/ 'traveler'.

Things are more complicated in Assamese, where rightward shift is not clearly connected to prominence patterns (as predicted by Mahanta 2001). Instead, it appears rightward shift in Assamese from the initial to second syllable is simply an alternative option, as in Figure 8. It is unclear what drives rightward shift in Assamese: it may be purely stylistic, or below the level of consciousness. Another possibility could be that instead of rightward shift of the L\*, the late rise could be explained as a contour tone on the right edge of the RRC, namely a rising LHa, incorporating a L target near the right boundary. Further work using more varied word shapes is needed here.

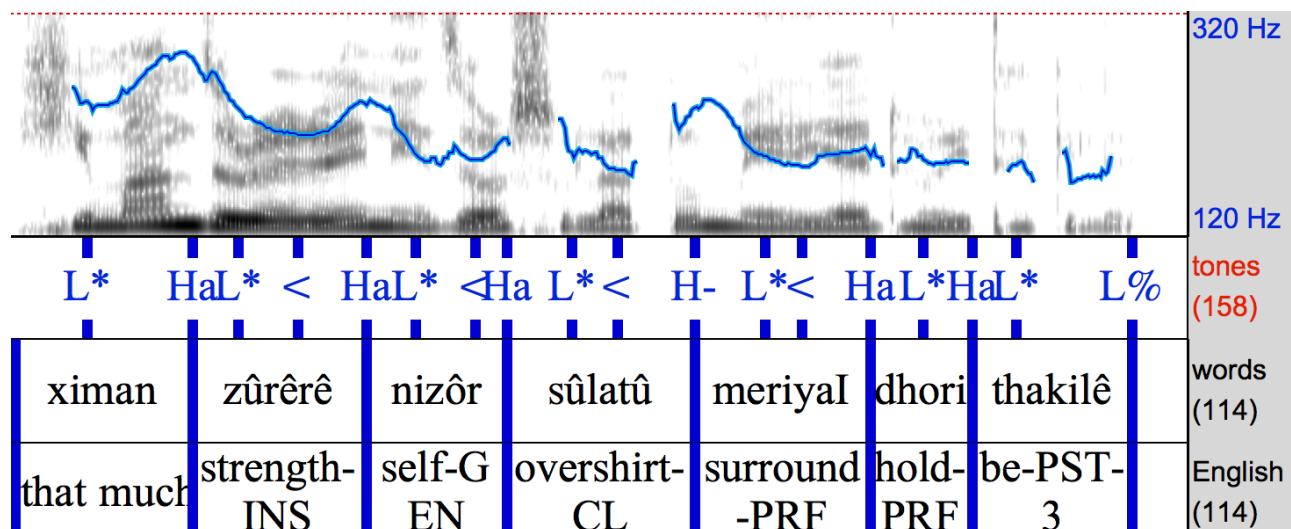


Figure 8. Optional rightward shift of L\* in Assamese is transcribed here as L\*...<, with the < marking the point where the L tone is realized. /xi'man 'zɔɽɛɽɛ ni'zɔɽ 'sɔlatɔ 'meriɽai 'dʰɔɽi 'tʰakile/ 'The more tightly he kept holding his cloak around him.' Prominence (following Mahanta 2001) is marked to illustrate that the L tones do not consistently appear on the prominent syllable.

#### 4.2 Number and alignment of H tones

The results of the current comparative work suggest that the H target is typically AP-final in the Indic SALs studied (Assamese, Bengali, Nepali, Hindi), in line with the majority of previous work on SAL intonation; this can be considered the “typical” pattern for SALs. For Telugu and Tamil, however, the peak of the H target is (also) typically reached on the second syllable (Tamil) or third vocalic mora

(Telugu), suggesting a complex pitch accent ( $L^*+H$ ) with a language-specific alignment specification for the trailing tone. In fact, I propose that Tamil and Telugu have more complex tonal templates available than for the other SALs studied, with the option of having two H targets per RRC, one closely following the prominence and another near or at the phrase boundary.

Unlike the Indic languages studied here, the rise from the L target in Telugu and Tamil is typically not a steady slope to the phrase boundary. Instead, the rise peaks within the first few syllables of the RRC, regardless of the length of the overall phrase. In the case of Tamil, the peak is reached at the end of the syllable following the accent, as in Figure 9, suggesting a contour pitch accent such as  $L^*+H$ . In Tamil, this early rise does not preclude the existence of a boundary tone at the AP's right edge. In fact, Keane (2014) notes that many APs in Tamil appear to have a double rise, with one H target near the accent and another at the boundary, each H target preceded by a L target. From the current analysis, I propose that a fully realized AP in Tamil can contain a complex pitch accent  $L^*+H$  and a complex boundary tone  $LH_a$ , as in Figure 10. Keane (2014) also considered the possibility that this  $LHLH$  contour is in fact composed of two APs, effectively  $L^*...Ha...L^*...Ha$ . I also leave this possibility open, especially considering that double rises are only seen on morphologically complex words, suggesting that each (orthographic) word may be composed of multiple APs; more work is needed here.

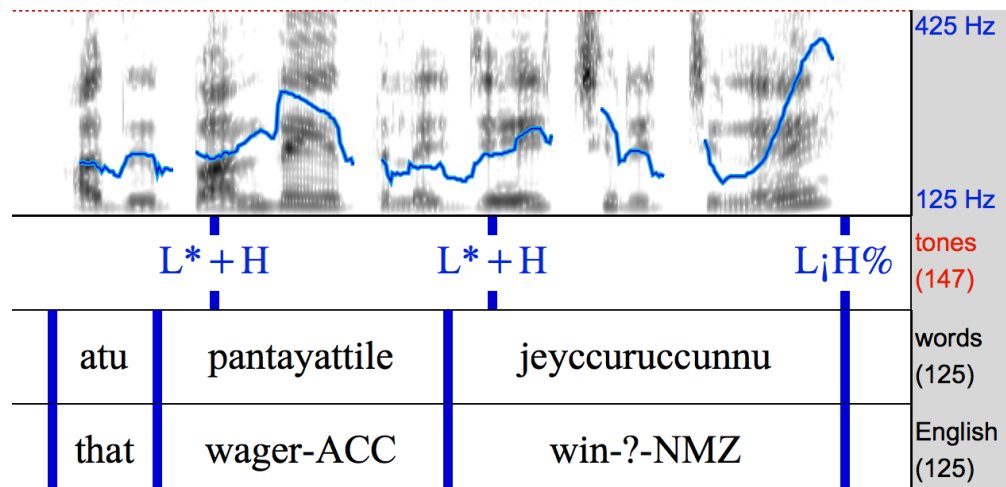


Figure 9. Two contour pitch accents  $L^*+H$  in Tamil. /atu paṅṭajaṭṭile dʒejtʃ:urutʃ:unnu/ ‘...the one who won that wager...’ The equivalent transcription for each rise would be  $L^*...H$  in Keane (2014).

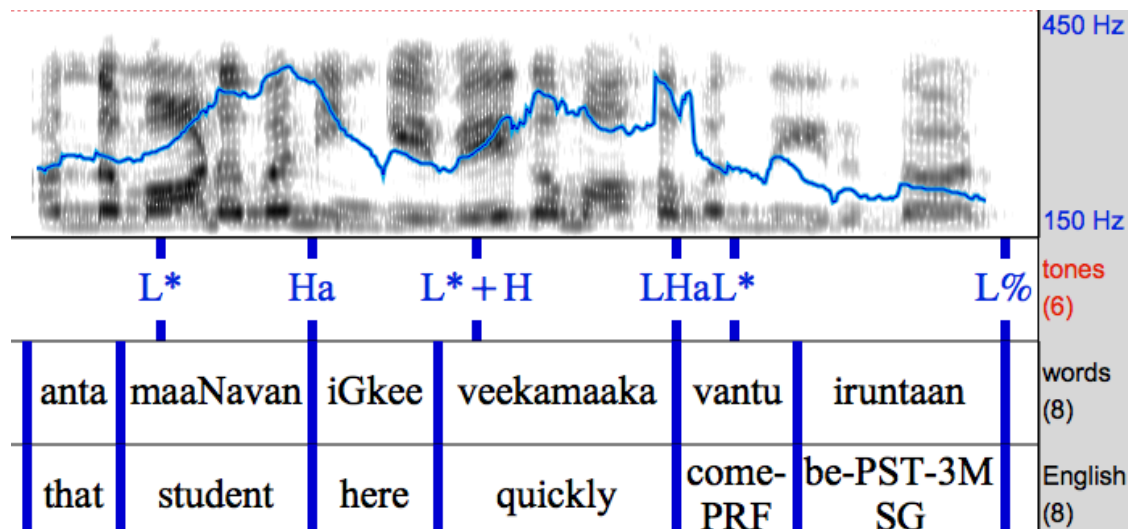


Figure 10. Double rise within a single orthographic word /ve:kama:ka/ ‘quickly’ in Tamil, suggesting either a L\*+H...LHa contour or a sequence of two APs. /anta ma:ṇavan iṅke: ve:kama:ka vanta irunta:n/ ‘That student has come here quickly (and stayed).’ Example taken from Keane (2014), in which the pitch contour is transcribed L\*...H...L\*...H.

For Telugu, this prominence-adjacent peak comes slightly later than its Tamil equivalent, seemingly aiming for the third vocalic mora of the phrase, as in Figure 11. (This can occur on the second syllable if either of the first two syllables contains a long vowel, or on the third syllable otherwise.) Despite this longer rise, it can also be considered a contour pitch accent, as the H peak is tied to the distance from the accented syllable rather than the right edge of the phrase.

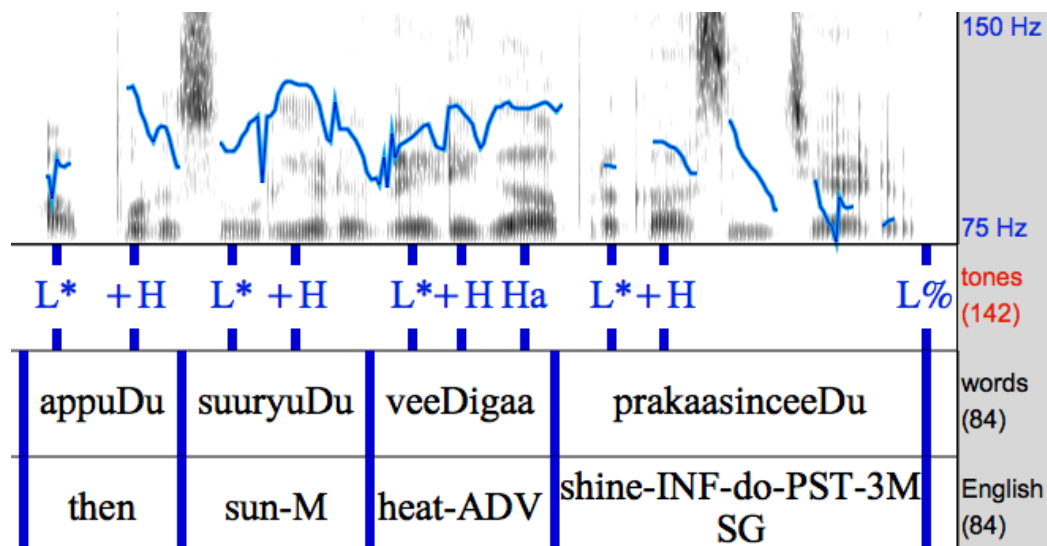


Figure 11. Plateau between two H targets in a single orthographic word /ve:ɖiɖe:/ ‘warmly’ in Telugu, suggesting an L\*+H...Ha pattern. /əppuɖu su:ɾjuɖu ve:ɖiɖe: prəkə:sintʃe:ɖu/ ‘Then the Sun shined warmly.’ Recording and IPA from Bhaskararao & Ray (2016 in press).

Telugu also allows for two H targets within a given word, as in Figures 11 and 12, although these surface quite differently than in the Tamil pattern. While not clearly predictable in Tamil, the appearance of the second H target in Telugu appears to be predictable based on three factors. This first factor is vowel length, as the second H target only occurs on phonemically long vowels. Secondly, the target vowel must



occur outside the pitch accent domain, i.e. it must come after the third vocalic mora. Thirdly, the AP containing this long vowel must not be IP-final; no second H target is found in IP-final APs. Thus, I propose this H target is effectively a boundary tone Ha, slightly displaced from the phrase edge as it seeks a long vowel host that may not be strictly phrase-final. As long-vowel-seeking boundary tones are not widely documented cross-linguistically, more research is needed to discern whether the claims about Telugu hold when looking across speakers and styles.

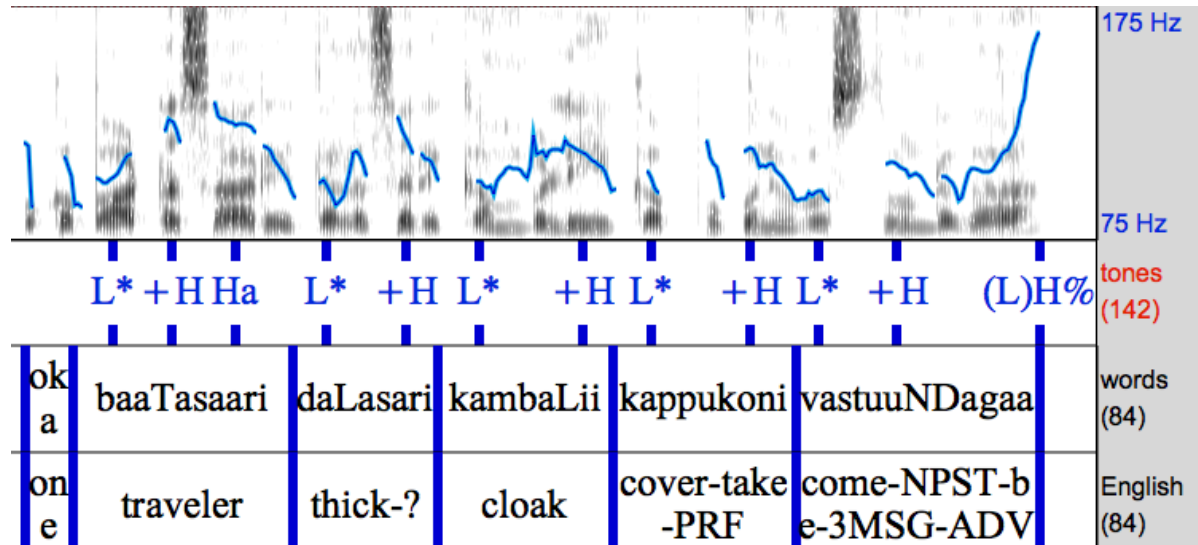


Figure 12. The presence of Ha in Telugu depends on the existence of a long vowel outside the pitch accent domain as well as a lack of IP boundary tones within the same range. /okə bə:ʈəsə:ri dɐʈəsəri kəmbɐli: kəppukoni vəʃtu:ŋdɐgə:/ ‘As a traveler was coming wrapped in a thick cloak...’. Recording and IPA from Bhaskararao & Ray (2016 in press).

In some of the Indic languages studied, an early peak for the H target seems to be a stylistic choice, and generally precludes the existence of an H target at the phrase boundary, unlike the case in Tamil and Telugu. In Bengali, for example, earlier work (Khan 2008/2014) proposed L\*+H with the H peak reached at the end of the second syllable as an alternative to L\*...Ha, often in IP-final position (Figure 13). Similar early rises can be found in Nepali as well.

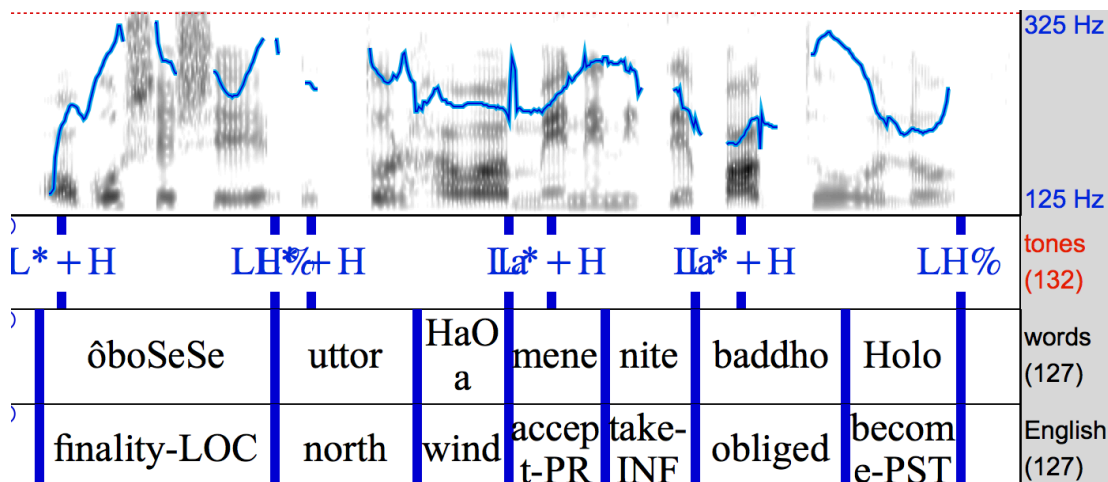


Figure 13. Early H target in Bengali as a stylistic choice (L\*+H) rather than L\*...Ha, in the phrase /ɔboʃeʃe ut̪:ɔɪ haɔa mene niʈe baɖʱ:o holo/ ‘In the end, the North Wind was obliged to accept...’.

### 4.3 L tone raising

Rising contours also vary in tonal realization from interactions with segmental phonetics; in the recordings transcribed for the current study, L\* was often found to be noticeably raised to a level that could be characterized as “mid-range” between the expected levels for L\* and Ha. Indeed, while M tones are generally avoided in AM Theory-based proposals, Mahesh (2016) labels similar instances as M\* in Malayalam. These instances appears to be only possible when the syllable bearing the pitch accent begins with a voiceless consonant or a null onset (i.e. a vowel-initial syllable), although it is not obligatory. In some recordings (e.g. for Bengali), this raised form, transcribed  $\hat{L}^*$ , appears often with syllables beginning with voiceless stops, affricates, and fricatives, whereas for other recordings (e.g. for Tamil), it appears most noticeably with initial fricatives only, as in Figure 14.

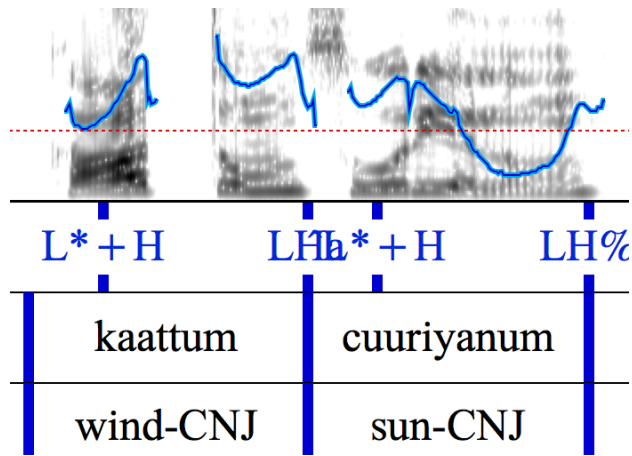


Figure 14. Example of raised pitch accent  $\hat{L}^*$  on /su:rjanum/ ‘sun-CNJ’ in Tamil.

There is a well-established phonetic connection between voicing and  $f_0$  (see Kingston 2011 for an overview), the articulatory mechanisms of which are complex and not fully understood. Essentially, what is most common crosslinguistically is that voiced consonants promote lower  $f_0$ , which can be exaggerated and eventually reanalyzed as the primary cue to a contrast, leading to a phonemic low tone. In these SALs, indeed, voiced consonants do get paired with the more canonical L\*, and only voiceless consonants can have the raised  $\hat{L}^*$ . However, what is mysterious is that voiceless consonants seem to be driving a raising of pitch to a mid level rather than the crosslinguistically more common lowering of pitch by voiced consonants; it may be that this is a more abstract phonologization of  $f_0$  lowering by voicing, emerging as  $f_0$  raising by voicelessness. Whichever the direction of this change, it is possible that this can be the beginning of an emergent tone contrast, tentatively proposed by Purcell et al. (1978).

## 5 Summary and future directions

Returning to our original question of whether there is a “typical” SAL intonation, even this limited collection of recordings reveals that in some basic ways, the answer is yes. In all six SALs studied here, as well as what we know from the general consensus in the literature, the placement of prominence is not lexically contrastive, even if it can vary within and across languages, and it is not overtly marked with stress in the way that prominence is marked in English. Each prominent syllable is eligible to host a pitch accent, which is the head of a domain that can be called an Accentual Phrase (AP), also often called a Phonological Phrase (P-phrase). Within each AP, there is a characteristic rising contour, starting from a low pitch on (or occasionally near) the prominent syllable (L\*) and rising to a high target (+H or Ha/H<sub>p</sub>) later. The low target itself can be notably raised due to segmental interaction.

Beyond these properties, however, the languages analyzed here show marked differences in several parts of their intonational phonology, including in the underlying structure and surface realization of their repeated rising contour. The AP's L tone marks the prominent syllable, which can be non-initial in Hindi; Assamese shows more variation. Similarly, the AP's H tone can mark the right edge (Assamese, Hindi), the long vowel closest to the right edge (Telugu), the tail of the prominent syllable, or some combination of these, in alternation (Bengali) or simultaneously (Tamil).

Some of these divergences, especially those of tonal alignment, stem from crosslinguistic variation in vowel weight, where Dravidian languages (Tamil, Telugu) have a straightforward short vs. long vowel system, Hindi has a centralized vs. peripheral vowel system, and peripheral Indic languages (Assamese, Bengali, Nepali) have no vowel weight distinctions. Indeed, while the Indic languages can be said to have [L\*...Ha] as their most iconic intonational unit, the Dravidian languages appear more complicated when words of different lengths and segmental content are considered. Word length can promote the projection of a second H target in Tamil, producing a double rise, while a long vowel outside the pitch accent domain can project a second H target in Telugu, producing a plateau. Other differences, such as the number of tonal targets or their optionality, cannot be directly tied to segmental or syllabic properties, and thus have to be taken as independent areas of variation.

Of course, while the current study establishes that even a limited data set reveals notable variation in the RRCs of SALs, many questions remain. How pervasive is the phenomenon of tone alignment to long vowels in languages other than Telugu? How pervasive and how perceptible is the prominence-independent rightward shift of L\* in Assamese? How perceptible is the variation between L\* and its raised variant  $\wedge$ L\*? Could this be a sign of an emergent contrast, possibly leading to another wave of tonogenesis within SALs? For those SALs that have already undergone tonogenesis from historical aspiration (e.g. Punjabi, Sylheti), how do lexical tones and intonational tones interact, and how similar do these systems look to non-tonal SALs? Lastly, the current study only focuses on a small number of speakers producing a controlled set of data representing languages in just two families; more speakers producing more kinds of material in more languages, especially those outside the dominant Indic and Dravidian families, must be incorporated into a fully comprehensive look at SAL intonation.

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## Coda/Onset Asymmetries in Dhivehi

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### ABSTRACT

The asymmetry between codas and onsets in neutralizations and assimilations is a challenge for classic OT, which operates only on output constraints and does not distinguish between  $VC_1C_1V$  and  $VC_2C_2V$  as the output of  $/VC_1C_2V/$ . Serial forms of OT capture the asymmetry by making coda neutralization a prerequisite for assimilation. Dhivehi offers evidence that neutralization does in fact precede assimilation, as neutralization of coronal /t/ leaves a coronal glide ‘trace’ that persists after assimilation of a coda to a following onset. However, onsets assimilate to preceding codas in certain morphological environments when the coda is retroflex and the onset is dental. This kind of assimilation cannot be captured by serially ordered neutralization and assimilation, and the analysis requires the use of either morphologically targeted constraints or the reranking of constraints between morphological levels.

### 1 Introduction

Cross-linguistically, coda consonants are weak. Depending on the language and the context, coda consonants may assimilate to a following onset, undergo place neutralization (debuccalization), or delete entirely. Onset consonants, by contrast, are stable (Wilson 2001, McCarthy 2007a, 2008). Both coda debuccalization and coda-to-onset assimilation are attested in Dhivehi [ISO 639-3: div], the national and only native language of the island nation of the Maldives. Dhivehi is an Indo-Aryan language whose closest relative is Sinhala, although it draws its high-register vocabulary from Arabic and Persian, rather than Pali and Sanskrit as Sinhala does. Dhivehi also displays perseveratory or progressive (onset-to-coda) assimilation of dentals to retroflexes in certain morphological contexts, suggesting that the comparative weakness of codas compared to onsets is not absolute, and requiring a constraint that specifically triggers assimilation (in line with Steriade 2001).<sup>1</sup>

Cross-linguistic tendencies with regard to weakness of onsets are captured schematically in (1).

- (1) Assimilation:  $VC_1C_2V \rightarrow VC_2C_2V$ ,  $*VC_1C_1V$   
Deletion:  $VC_1C_2V \rightarrow VC_2V$ ,  $*VC_1V$   
Debuccalization:  $VC\# \rightarrow V\#\#$

Coda/onset asymmetries are a problem for classic Optimality Theory (OT) as formulated by Prince & Smolensky (2004). In OT, the weakness of word-final codas is captured by CODA-COND, a cover constraint that assigns violations to codas that license their own Place nodes, formulated within OT in Ito & Mester (1994), and harking back to Ito (1988). However, while CODA-COND is satisfied by coda deletion or assimilation, it is equally satisfied by the deletion or assimilation of the second (onset) consonant in a cluster, as pointed out for the deletion case by Wilson (2001) and for the assimilation case by McCarthy (2007a, 2008). The failure of classic OT to distinguish coda-to-onset (regressive or anticipatory) assimilation from onset-to-coda (progressive or perseveratory) assimilation is shown schematically in Tableau 1, in which the

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<sup>1</sup> Data in this paper come from Cain & Gair (2000), one of the few published works on Dhivehi grammar; Reynolds (2003), the most complete published Dhivehi-English dictionary; and my own fieldwork and language-learning experiences, the results of which are forthcoming in a grammar (Gnanadesikan in press). The forms cited here reflect the standard dialect.

intended winning output  $VC_2.C_2V$  ties with an intended losing output  $VC_1.C_1V$ , in which the onset assimilates to the preceding coda.

$/VC_1C_2V/$	MAX	DEP	CODA-COND	HAVE-PLACE	IDENT-PLACE
$VC_1.C_2V$			*!		
☺ $VC_2.C_2V$					*
⊗ $VC_1.C_1V$					*
$V?.C_2V$				*!	
$V.C_2V$	*!				
$V.C_1V.C_2V$		*!			

Tableau 1: Coda-onset assimilation in classic OT

Serial forms of OT, however, can derive the result that codas assimilate to onsets but not vice versa, as McCarthy (2007a) does with OT with Candidate Chains (OT-CC, McCarthy 2007b) and McCarthy (2008) does with Harmonic Serialism (HS). In serial versions of OT (and concentrating henceforth on Harmonic Serialism specifically), candidates are not only evaluated at the output of the grammar, but also step-by-step along the way as the candidates diverge from the input. Specifically, in HS (introduced as a possible variant of OT in Prince & Smolensky 2004, 6) candidates are evaluated after (at most) one change is made. Since delinking the underlying Place node from a coda and relinking the coda to the Place node of a following onset count as two changes, each of these two changes must be harmonically improving. The result is that an onset will not lose its Place node, since doing so has no effect on CODA-COND and is not harmonically improving. Thus onsets will not assimilate to codas, but codas will assimilate to onsets. The derivation of coda assimilation is shown in Tableau 2, in which the faithful parse is given first (labeled FP), and the winning candidate for each pass through the grammar is given next (labeled St 1 for Step 1, etc.). The candidate in which the onset loses its Place node loses at Step 1, because deleting the onset's Place does not satisfy CODA-COND.<sup>2</sup>

$/VC_1C_2V/$	MAX	DEP	CODA-COND	HAVE-PLACE	MAX-PLACE	NOLINK-PLACE
FP $VC_1.C_2V$			*!			
St1 $V?.C_2V$				*!	*	
St2 $VC_2.C_2V$						*

Tableau 2: Coda-onset assimilation in Harmonic Serialism

<sup>2</sup> As McCarthy (2007) points out, serial solutions to coda/onset asymmetries require using MAX(feature) constraints rather than the IDENT(feature) constraints more often used in classic OT, hence this difference between the constraints used in Tableau 1 and Tableau 2.

McCarthy (2007) sums up the serial approach to coda/onset asymmetry thus: “[D]eletion or assimilation of a consonant is possible **only if that consonant first loses its place specification**, and loss of a place specification is harmonically improving under CODA-COND only when coda consonants are affected.” (page, 2 in ROA version; emphasis added). In other words, debuccalization is necessarily ordered before deletion or assimilation. Thus the three processes (debuccalization, coda deletion, and anticipatory coda-to-onset assimilation) are related to each other within HS, and the asymmetry between codas and onsets is explained. However, McCarthy does not provide any theory-external evidence in support of the ordering of debuccalization before assimilation (or deletion). The facts of Dhivehi coda debuccalization and assimilation provide just such evidence. However, as will be returned to in Section 3, CODA-COND applied within HS cannot explain all the interactions between Dhivehi codas and onsets.

## 2. Dhivehi Debuccalization and Assimilation with the Coronal ‘Trace’

Dhivehi obeys CODA-COND relatively strictly. The consonants found in word-final position are underlyingly /m/, /n/, /t/, /k/, /ʃ/, and /s/, as shown in (2).<sup>3</sup> Of these, the nasals neutralize in prepausal position to  $\eta$ , and the obstruents neutralize to  $\text{ʔ}$ , as shown at the left in (2).<sup>4</sup> When a vowel-initial suffix is added, the neutralization does not occur, as shown at the right in (2). An exception to the neutralization is /s/, which surfaces unchanged as *s* in coda positions but becomes *h* intervocally. The case of /s/ is included in the final line of (2) for the sake of completeness but is otherwise not discussed further in this paper.<sup>5</sup>

(2) /nam/	naŋ	‘name’	/nam + ek/	name $\text{ʔ}$	‘a name’
/fan/	faŋ	‘palm leaf’	/fan + ek/	fane $\text{ʔ}$	‘a palm leaf’
/ruk/	ru $\text{ʔ}$	‘palm tree’	/ruk + ek/	ruke $\text{ʔ}$	‘a palm tree’
/raʃ/	ra $\text{ʔ}$	‘island’	/raʃ + ek/	raʃe $\text{ʔ}$	‘an island’
<b>/fot/</b>	<b>fo<math>\text{ʔ}</math></b>	<b>‘book’</b>	<b>/fot + ek/</b>	<b>fote<math>\text{ʔ}</math></b>	<b>‘a book’</b>
/bas/	bas	‘language’	/bas + ek/	bahe $\text{ʔ}$	‘a language’

As shown in the penultimate line of (2), the behavior of the coronal dental stop /t/ is unusual. Debuccalization to  $\text{ʔ}$  occurs, as with the other obstruents (other than /s/). However, the [Coronal] feature of /t/ surfaces as a coronal glide. The glide is apparently non-segmental, as it does not add further weight to the syllable (i.e. *fo $\text{ʔ}$*  is a heavy, not a superheavy, syllable). Cain & Gair (2000, 11) describe it as an offglide of the vowel, but I analyze it as an onglide to  $\text{ʔ}$ , as it does not behave like the diphthong /ai/ (which monophthongizes to  $\text{æ}$ : in the standard dialect). Thus the [Coronal] feature remains on the segment with which it is underlyingly associated, but shows up as a V-Place rather than a C-Place feature (assuming a theory of place features along the lines of Clements & Hume 1995).

When a coda consonant (other than /s/) is followed by a consonant other than /h/, either within or across words, the coda assimilates to form a geminate or partial geminate (i.e. a homorganic nasal-stop cluster) with the following onset. This is shown in (3), in which the words in (2) are repeated at the left, but are given a consonant-initial suffix at the right. As in (2), the coronal stop produces a coronal ‘trace’ onglide as in the bolded penultimate line in (3).

<sup>3</sup> Other word-final consonants do not occur, other than /l/, which surfaces as a back vowel in native words (e.g., /bol/ → *boo* ‘head’, cf. *bole $\text{ʔ}$*  ‘a head’). In loanwords, other final consonants are made licit with the addition of an epenthetic *u*. Word internally, coda consonants also include the first element of a geminate or partial geminate.

<sup>4</sup> When a vowel- (or /h/-) initial word follows, the neutralizations are all to  $\eta$ , with /t/ becoming  $\text{ʔ}\eta$ , as in /fot ufeddum/ *fo $\text{ʔ}\eta$  ufeddum* ‘book production’.

<sup>5</sup> It may be that the /s/ is protected from the effects of CODA-COND by higher ranking constraints preserving its [strident] feature; however, this feature is lost when a vowel-initial suffix is added, so it cannot be all that highly protected. The exceptional behavior of /s/ in Dhivehi is a matter for further work.

(3) /nam/	naŋ	‘name’	/nam + tak/	nantaʔ	‘names’
/fan/	faŋ	‘palm leaf’	/fan + tak/	fantaʔ	‘palm leaves’
/ruk/	ruʔ	‘palm tree’	/ruk + tak/	ruttaʔ	‘palm trees’
/raʃ/	raʔ	‘island’	/raʃ + tak/	rattaʔ	‘islands’
<b>/fot/</b>	<b>foʔʔ</b>	<b>‘book’</b>	<b>/fot + tak/</b>	<b>foʔttaʔ</b>	<b>‘books’</b>
/bas/	bas	‘language’	/bas + tak/	bastaʔ	‘languages’

While the assimilation in (3) happens before any consonant other than /h/, the case in which the following onset is /t/ is particularly interesting. The output of /fot + tak/, *foʔttaʔ* ‘books’, with the coronal glide, is *less* faithful to the input than a simple *\*fottaʔ* would be. Outputs such as *rattaʔ* ‘islands’ and *ruttaʔ* ‘palm trees’ (as well as monomorphemic forms such as *batti* ‘lamp’ and *datta* ‘older sister’) indicate that a geminate *tt* presents no difficulty in Dhivehi. The output *foʔttaʔ* ‘books’ is, however, *more* faithful to an intermediate debuccalized form *\*foʔʔtaʔ* (ungrammatical as an output, but not ungrammatical as an intermediate form), suggesting that the debuccalized form is indeed created before the assimilated form. If the assimilation could occur in one step, there would be no need for the coronal trace, at least in the case where the following consonant is /t/.

The behavior of Dhivehi’s coronal trace can be easily analyzed in an HS framework. The retention of [Coronal] in the form of the coronal onglide trace must satisfy some faithfulness constraint. This can be assumed to be MAX-Coronal, which in Dhivehi outranks other MAX-Place constraints. However, the coronal trace must violate some other constraint by showing up in the output as a vocalic rather than a consonantal place. This constraint may be called IDENT-Tier. It must be assumed that switching tiers from C-Place to V-Place (or vice versa) is a one-step process, whereas the delinking and spreading that occurs in assimilation is a two-step process. The constraints and ranking of relevant constraints required for deriving the coronal trace in the assimilation case are shown in Tableau 3. In the case of prepausal neutralization, the derivation stops at Step 1, since there is no following onset to assimilate to. In either case, a coronal trace is derived from an underlying /t/.<sup>6</sup>

/fot + tak/	MAX-COR	CODA-COND	IDENT-TIER	HAVE-CPLACE	NO LINK-PLACE
FP fo[t <sub>1</sub> .t <sub>2</sub> ]ak		*!			
St1 fo[ʔʔ.t]ak			*!	*	
St2 fo[ʔt <sub>2</sub> .t <sub>2</sub> ]ak					*

Tableau 3: Coronal Trace in Harmonic Serialism

The coronal trace could also be derived without serialism by using Output-Output constraints (as proposed by Benua 1997) that require faithfulness of the inflected /fot + tak/ *foʔttaʔ* ‘books’ to the uninflected /fot/ *foʔʔ* ‘book’. Such a parallel O-O analysis gives the uninflected form *logical* priority (as something to be faithful to) but not *temporal* priority. Some sort of priority of the debuccalization (that occurs in the uninflected form) over assimilation (that occurs in the inflected form) holds in either an O-O or an HS analysis, however. Yet HS has the additional benefit of providing an analysis of both the coronal trace and coda/onset asymmetry in general. Output-Output faithfulness, on the other hand, has nothing particular to say about the general problem of coda/onset asymmetry.

<sup>6</sup> /t/ is not the only coda coronal. The retroflex /ʃ/ also occurs word finally but leaves no coronal trace. This is presumably because the [retroflex] dependent of [Coronal] has no glide equivalent and is not permitted on the V-Place tier.



### 3. Retroflex Assimilation and Morphological Levels

In most cases the asymmetry between codas and onsets in Dhivehi is as expected based on cross-linguistic norms, with codas being weak and onsets being strong. However, in certain morphological environments, onsets assimilate to preceding codas. Specifically, retroflexion spreads to a coronal onset that begins a derivational morpheme, the second half of compound, or a clitic postposition, as in (4).<sup>7</sup>

In other environments—in inflectional morphology or across words in phrases—codas assimilate straightforwardly to onsets, losing any retroflexion in the coda but retaining the rare cases of retroflexion in the onset. This is shown in (5).

(4) /avaṣ + teri/	‘neighborhood + ADJ’	avaṭṭeri	‘neighboring’
/aṣ # diha/	‘eight # ten’	aḍḍiha	‘eighty’
/kurumaṣ=taka/	‘doing.DAT=BEN’	kurumaṭṭaka	‘for the sake of doing’
(5) /raṣ + tak/	ratta?	‘islands’	(*raṭṭa?)
/varaṣ# #duruga(i)/	varadduga(i)	‘very far’	(*varaḍḍurugai)
/ek# #ṭaviyani/	eṭṭaviyani	‘one [letter] “ṭaviyani”’	

Considering first the cases in (4), while onset-to-coda assimilation is rare in general, perseveratory retroflex assimilation (in languages that have retroflexes) is actually normal cross-linguistically. As Steriade (2001) points out, retroflexion is more easily perceived *after* a vowel than before. This fact leads Steriade to propose a fixed ranking that favors the retention of retroflexion after a vowel over its retention before a vowel, as in the following slightly abridged version.<sup>8</sup>

(6) IDENT [retroflex]/ V\_\_ >> IDENT [retroflex]/ \_\_V (adapted from Steriade 2001)

The ranking in (6) is consistent with the fact that retroflexes generally do not start words or lexical morphemes in Dhivehi except in loanwords. The IDENT [retroflex] constraints cannot be the whole story, however. For one thing, the behavior of coda retroflexes is variable, as demonstrated by the difference between the forms in (4) and (5).

For another thing, a trigger is needed for the rightward spreading of [retroflex]. Unlike in the case of leftward spreading from onset to coda, CODA-COND cannot be the trigger for spreading [retroflex] rightward from coda to onset. If rightward spreading of [retroflex] satisfied CODA-COND, then we would expect it to happen whenever a retroflex coda is followed by a dental onset, but in fact it does not. Something else must be the trigger.

The HS account of the normal coda/onset asymmetry has the satisfying aspect of not requiring a constraint that specifically drives assimilation. Rather, the assimilation derives from the interaction of other constraints in the presence of CODA-COND, and assimilation belongs to a family of responses to CODA-COND that also includes debuccalization and deletion. A similar account for onset-to-coda retroflex assimilation would be theoretically satisfying. However, such an account does not seem to be available. A constraint ruling out [retroflex] in onsets (similar to CODA-COND ruling out Place in codas) would simply prohibit retroflex onsets without forcing assimilation, since there is no “HAVE-[retroflex]” constraint

<sup>7</sup> The latter case, that of the clitic postposition, may be frozen in the language. The only context in which it occurs is the benefactive postposition, which begins with a coronal stop and always occurs in the assimilation environment, following the dative case ending /-aṣ/. With no alternations, the benefactive postposition is considered by speakers to begin with a retroflex /ṭ/, which is almost unheard of in native Dhivehi lexical morphemes. The other cases of retroflex assimilation (derivational and compounding morphology) appear to be productive, though my consultant reports some optionality of the assimilation in nonce forms, which may be related to slow vs. fast speech contrasts or to uncertainty over the compound status of such words.

<sup>8</sup> I avoid here the issue of what featural configuration causes retroflexion and designate it simply as [retroflex]. I have also generalized from Steriade’s statements about apical consonants to include the Dhivehi dental stops, which are phonetically laminal but do not contrast with apical alveolar stops and may be considered the unmarked coronal series in Dhivehi.

analogous to the HAVE-PLACE constraint of Tableau 2. Instead, a constraint that actively drives assimilation is apparently needed; it must furthermore not be vacuously satisfiable by debuccalization, or coda retroflexes could simply lose their place to avoid violating the constraint, especially given that debuccalization is an option in the language. Thus an analysis parallel to that of coda assimilation is not available, and a constraint like Steriade’s (2001) AGREE constraint is needed. Therefore, I use AGREE-[retroflex] as an assimilation constraint that prohibits clusters with two different values of [retroflex].

However, a single ranking of AGREE-[retroflex] will not suffice to derive both the outputs in (4) and those in (5). Whether coda retroflexion will spread to a following onset depends on the morphological context in which it occurs. Coda retroflexion *spreads rightward* in derivational morphology, compounds, and lexical clitics, as in (4), but *disappears* in inflectional morphology or across words in phrases, as in (5). The rare cases of onset retroflexion actually spread the retroflexion leftward to preceding codas across words in phrases, as when the retroflex that starts the word *tavıyani* (the name of the letter that spells /t/) spreads leftward in /ek tavıyani/ *eṭṭavıyani* ‘one “tavıyani”’ in (5). Thus there is a difference between derivational and lexical morphology (what we can call Level 1 morphology) on the one hand, and inflectional and phrasal morphology (what we can call Level 2 morphology) on the other. To capture this distinction the constraints must either be morphologically targeted or have different rankings at the two different morphological levels.

Different rankings for different morphological levels is the solution pursued by theories of Stratal OT (e.g., Kiparksy 2000, Ito & Mester 2003). Although Stratal OT has been criticized (e.g., McCarthy 2007b) for being too powerful, some reference to morphological environment must be made here. Either the constraints themselves must come in sets, each member of which makes reference to a particular type of morphology, or the constraints must be allowed to be reranked between Level 1 and Level 2. In either case there is the theoretical possibility of an explosion of the grammar.

A single instance of constraint reranking between Level 1 and Level 2 (or a single split in ranking between a Level 1- and a Level 2-targeted constraint) serves to derive the facts of [retroflex] assimilation in HS as laid out in Tableau 4 and Tableau 5, which show the derivation of *avatt̥eri* ‘neighboring’ from /avaş + teri/. At Level 1 the assimilation-triggering AGREE-[retroflex] constraint, shown in bold Tableaux 4 and 5, outranks CODA-COND, while at Level 2 it ranks below CODA-COND.

/avaş + teri/	<b>AGREE- [retro]</b>	CODA-COND	HAVE-CPLACE	IDENT- [retro]/V__	IDENT- [retro]/__V
FP a.vaş.te.ri	<b>*!</b>	*			
St1 a.vaş.ṭe.ri		*			*

Tableau 4: Level 1 morphophonology

a.vaş.ṭe.ri	CODA- COND	<b>AGREE- [retro]</b>	HAVE-CPLACE	IDENT- [retro]/V__	IDENT- [retro]/V__
FP a.vaş.ṭe.ri	<b>*!</b>				
St1 a.vaṭ.ṭe.ri		<b>*!</b>	*	*	
St2 a.vaṭ.ṭe.ri				*	

Tableau 5: Level 2 morphophonology

The output of Tableau 4 does not show the final output, merely the output of Level 1 morphophonology. It serves as the input to Tableau 5; the output of Tableau 5 is the final output. The forms in (5), such as *ratta?* ‘islands’ from /raʃ + tak/, do not partake in the derivation in Tableau 4, having no Level 1 morphology, and simply undergo the assimilation driven by the high-ranked CODA-COND in Tableau 5.

By the analysis laid out in Tableaux 4 and 5, the retroflexion spreads rightward from the coda to the following onset, then the coda loses its place (including its retroflexion), and then the features of the onset (including the retroflexion) spread leftward from the onset to the coda. In other words, the retroflexion spreads rightward, is lost from the coda, and then spreads leftward again. While this may seem unnecessarily roundabout, it is consistent with the fact that only retroflexion spreads rightward from the coda to the onset while almost all features of the onset spread leftward to the preceding coda. In other words, retroflexion is the only feature that spreads rightward but is a subset of the features that spread leftward.

#### 4. Conclusion

As is typical cross-linguistically, Dhivehi codas are generally weak as compared to onsets, and both debuccalization and assimilation occur, suggesting high ranking of CODA-COND. Unusually, however, coda /t/ leaves a coronal ‘trace’ onglide in both the debuccalization and assimilation cases, a fact that actually leads to lower faithfulness to the input in cases where the assimilation is to a /t/. The coronal trace is evidence that the debuccalization occurs before the assimilation, so that the relevant faithfulness in the assimilation case is actually to the debuccalized form, as is predicted by HS. Thus coda weakness and the coronal trace in Dhivehi are both neatly captured by an HS analysis without the need for O-O constraints. However, although coda-to-onset assimilation can be captured without any constraints that specifically force assimilation or refer to the specifics of the morphology, the facts of Dhivehi retroflex assimilation, which is sensitive to morphological level, indicate the need for AGREE-type constraints that specifically drive assimilation and for morphologically specific rankings (or morphologically specific constraints). While reranking at different morphological levels (or the breakdown of constraints into sets of morphologically targeted constraints) appears to add unwanted power to the grammar, it does appear to be necessary to capture the full range of coda-onset behaviors in Dhivehi. The reranking required in the Dhivehi case is of a single constraint, moved with respect to one other constraint, suggesting that the reranking of constraints between levels is in fact highly constrained.

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# Morphological Focus Marking in Standard Colloquial Assamese

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## ABSTRACT

The current paper investigates how morphologically marked focus is prosodically realised in Standard Colloquial Assamese (SCA), the standard variety of Assamese. It apart from demonstrating the distribution of morphological focus markers (MFMs) in SCA, highlights their relationship with their host, and their intonational behaviour. Further, the MFM marked focus has been compared with the contrastive focus (CF) realisation. We propose in this study that MFM induced focus is phonologically different from CF realisation.

## 1 Introduction

Assamese belongs to the Eastern Indo-Aryan language area of the Indo European language family (Goswami 1982, Goswami and Tamuli 2003). Standard Colloquial Assamese (henceforth SCA) is mostly spoken in the eastern districts of Assam: Tinsukia, Dibrugarh, Lakhimpur, Dhemaji, Sibsagar, Jorhat, Golaghat and Sonitpur (Moral 1992). In the present study, we have investigated the prosodic aspect of morphologically marked focus (henceforth MF). SCA obeys a hierarchically arranged prosodic structure, where the top most node is designated as Intonational phrase (henceforth IP), which normally matches up with a sentence (Twaha and Mahanta 2016). An IP is a construct of phonological phrases (henceforth P-phrase), which are tonally specified at two points – first syllable is associated with the pitch accent ( $L^*$ ) of the phrase and the final syllable materialises the P-phrase demarcating high boundary tone ( $H_P$ ). Further, P-phrases must contain at least one prosodic word (henceforth P-word), which prosodically maps a syntactic word. P-words lack tonal specifications unless they form P-phrases i.e. P-words in SCA are attributed with tones only at the post-lexical level when they constitute or contribute to P-phrases.

The final P-phrase in a declarative SCA utterance is marked by low a pitch accent ( $L^*$ ) which is followed by a high tone ( $H_P$ ) associated with the boundary of the P-phrase. Non-final P-phrases are designated with  $L^*$  pitch accent and  $H_P$  boundary tone. As far as tonal configuration is concerned, the final P-phrase is not different from non-final P-phrases.

When a constituent receives contrastive focus (henceforth CF), it bears the IP final pitch accent and is demarcated by a focus high boundary tone  $fH_P^f$ , and forms a phonological domain where phonetically motivated assimilation processes such as /r/ deletion are allowed. CF exercises pitch compressing impact on the string following focus, as a consequence all the P-phrases undergo deaccenting (see Twaha and Mahanta (2016) for details). Besides this prosodic marking of focus, SCA employs morphological focus clitics or markers (henceforth MFMs) in order to highlight a particular information.

Assamese demonstrates the presence of MFMs such as question emphatic clitic  $=ne$ , inclusive emphatic particle  $=o$  ‘also’ and restrictive emphatic particles such as  $=he$  ‘only’,  $=to$  ‘stresses the host’, etc. (Dutta Baruah 2007); in this paper, however, we will only consider  $=he$ . These particles always attract post-lexical prominence and ascribe prosodic prominence to the constituent hosting them. Assamese MFMs, like Bengali *emphatic clitics*<sup>2</sup> are comparable to English focusing adverbs (henceforth EFA) which are similar in meaning like  $=o$  ‘also’ and  $=he$  ‘only’ etc. Like EFAs, MFMs also phonetically highlight the prominence of their argument. However, unlike MFMs, an EFA ‘does not refer directly to focus semantic values’ rather it is the context which fixes the ‘domain of quantification’ (Rooth 1997).

This paper has been organised into the following sections. While §2 deals with the distribution of MFMs in SCA, §3 illustrates how MFM marked focus is materialised in SCA. Here the methodology adopted while collecting data for the present study has also been elaborated. In §4, findings of our previous studies on WF and CF realisation have been discussed. In the next section (§5), the outcomes of the present study

<sup>1</sup> The ‘f’ diacritic used here to denote the focus induced high tone was originally used by Khan (2008).

<sup>2</sup> See Lahiri and Fitzpatrick-Cole (1999)

have been argued. After a brief discussion comparing the findings of the previous and the present study in §6, the paper concludes with closing remarks.

## 2 Distribution of MFMs

In Assamese, MFMs are clitics which morphologically mark the focused status of a constituent. In traditional grammar a clitic has been described as a “little” word that lacks independent accent; Zwicky (1977) categorised clitics as “bound unaccented morphemes that sometimes are in construction with affixes”. This view, however, has been challenged by Anderson (2005) as problematic. According to him (Anderson 2011), a clitic is a phonological form that is not lexically assigned the status of a P-word. Earlier, Klavans (1995) also demonstrated occurrences of stress or accent assigned to clitics with reference to languages like Greek and Hixkaryana. According to her, clitics may be assigned stress by 1) phonological word rules, 2) intonational rules, or 3) semantic rules; clitics do not always lack stress. Lahiri and Fitzpatrick-Cole (1999) demonstrated how MFMs (they used the term *emphatic clitics*) are associated with prominence in Bengali. They attributed MFMs with an inherent lexical tone, which marks its existence in the prosodic phrasing at the post-lexical level with an H\*.

In the data collected for the present study on morphological focus marking, we see MFMs receiving prosodic prominence in terms of higher pitch value. However, before going into an elaborate discussion on the post-lexical assignment of accent to MFMs, it is worthwhile to gather some idea about how clitics are distributed in SCA.

In Assamese, similar to Bengali (Bayer and Lahiri 1990, Lahiri and Fitzpatrick-Cole 1999), MFMs adjoin nouns, verbs, adjectives and postpositions. In SCA, although an MFM may be attached to different classes of words (noun, verb, etc.), its host must qualify first as a P-word. For example in (1), we see MFM =hε can be attached to both inflected (1.c) and uninflected (1.b) nouns, since both the types of noun qualify as P-words.

- (1) a) (( rɔmɛn )<sub>Stem</sub> ) P-word → Ramen ‘proper noun’  
 b) ((( rɔmɛn )<sub>Stem</sub> ) P-word =hε ) P-phrase → Ramen=only  
 c) ((( ( rɔmɛn )<sub>Stem</sub> ) P-word -ɔk ) P-word =hε ) P-phrase → Ramen-OBJ=only  
 d) \*((( ( rɔmɛn )<sub>Stem</sub> ) P-word =hε ) P-phrase -ɔk ) P-word → Ramen=only-OBJ

While MFMs may follow noun stems, they cannot be followed by inflectional suffixes. We get ungrammatical expressions like (1.d) when the MFM =hε is placed between noun stem rɔmɛn and affix -ɔk.

Unlike nouns, verb roots do not constitute P-words; in order to form a P-word, a verb root/stem must be followed by an inflectional suffix. It is only after an inflectional suffix is added to the verb root/stem and a P-word is formed, that an MFM can be added to it. This process has been instantiated in (2), where the focus marker =hε does not get attached to the verb root kɔr ‘do’ directly as the latter is not self-sufficient to constitute a P-word. It is only after the inflectional suffix -i adjoins the root that it qualifies as a P-word, and subsequently focus marker =hε ‘only’ gets attached to it.

- (2) a) kɔr → do  
 b) (( kɔr -i )<sub>Stem</sub> ) P-word → do-PFV  
 c) ((( kɔr -i )<sub>Stem</sub> ) P-word =hε ) P-phrase → do-PFV=only  
 d) \*(( ( kɔr =he )<sub>P-phrase</sub> ) → do =only

When MFMs are attached directly to verb roots, we get ungrammatical outputs like (2.d), where the verb root kɔr is followed by the MFM =hε. In SCA, while an MFM can follow an affix, the former is never followed by the latter, and the P-word + MFM combination is obligatorily dominated by P-phrase node in the prosodic hierarchy.

## 3. SCA morphological focus

Superficially, the pitch contour of MFM marked focused constituents may look similar to that of constituents with CF; both the types of focus marking show rising pitch trend with the lowest point aligning with the first syllable and the pitch peak with the final syllable of the focused constituent. However, a

careful auditory and pitch track inspection calls for a different phonological explanation for MFM focus marking to that of CF. In the former case, the pitch peak realised on the final syllable, which is also the only syllable of MFM, exhibits an extra high, obligatorily blocking the IP internal downstep. In CF, although there is a pitch increase on the final syllable of the focused constituent (compared to its WF occurrence), this increase does not necessarily block downstepping. It is this exceptional rise on the focus particle that has motivated us to postulate that in MFM focus marking, it is not the leftmost syllable of the focused constituent that receives pitch accent, rather it is the focus particle that post-lexically qualifies as the most prominent syllable in the focused phrase. In CF condition, the focused constituent demonstrates L\*fH<sub>p</sub> pitch pattern where the first syllable receives L\* pitch accent and the final syllable bears focus high boundary tone fH<sub>p</sub>. When a constituent is focus marked with an MFM, the focused constituent plus MFM combination exhibit LfH\* pitch contour with low (L) tone realised on the initial syllable and the focus high pitch accent (fH\*) on the final syllable of the combination. Here we claim that in SCA, MFMs are pre-specified with a high morpho-lexical pitch accent which, besides morphologically highlighting their host P-words, mark their prosodic prominence by receiving the focus pitch accent fH\*. MFMs in SCA are comparable to Bengali emphatic clitics (Lahiri and Fitzpatrick-Cole 1999); however, in Bengali, emphatic clitic induced P-phrases are assigned two pitch accents (L\*H\*).

### 3.1. Methodology

We have collected and analysed data on how focus is realised when MFMs are attached to a constituent in SCA. The findings are then compared with the findings of our previous study on prosodic realisation of CF (Twaha and Mahanta 2016). In the present set of data, focus is explicitly marked by attaching MFMs to the right edge of the constituent focused. MF is initiated when speakers rectify a deliberate mistake committed by the recordist in relation to a particular constituent by highlighting the constituent with the MFM =hε. First, WF version of the sentences was recorded which was uttered by speakers in response to the question *ki hol?* ‘What happened?’; this version would provide us with a baseline against which we could compare any departure with respect to the intonational contour and prosodic phrasing of the utterances produced in CF context with the help of MFMs. In response to WF renderings by the speakers, the recordist produces the same utterance as an echo question with a mistake in respect of a constituent. Subsequently, the speaker makes the necessary correction by uttering the original sentence once again, but this time with the MFM =hε attached to the rectified constituent. Given below is an example, representative of the schema adopted for data recording. The speaker first produces the sentence *nɔgɛnɛ nɔjɔnɔk mala k<sup>h</sup>uzilɛ* ‘Nagen asked Nayan for a garland’ as an answer to the question *ki hol?*. Next, in response to the recordist’s echo question asked by replacing *mala* ‘garland’ by *k<sup>h</sup>jɔma* ‘forgiveness’, the speaker reproduces the sentence by marking the rectified constituent with MFM: *mala=hε* ‘garland only’.

Question: [ki hol] ?  
 what happen-PST  
 What did happen?

Speaker: [[nɔgɛnɛ]<sub>P</sub> [nɔjɔnɔk]<sub>P</sub> [mala]<sub>P</sub> k<sup>h</sup>uzilɛ]<sub>I</sub> ← WF  
 Nagen-SUB Nayan-OBJ<sub>I</sub> garland-OBJ<sub>O</sub> ask-PST.3  
 Nagen asked Nayan for a garland.

Question: [nɔgɛnɛ nɔjɔnɔk k<sup>h</sup>jɔma k<sup>h</sup>uzilɛ]?  
 Nagen-SUB Nayan-OBJ<sub>I</sub> forgiveness-OBJ<sub>O</sub> ask-PST.3  
 Nagen asked Nayan for forgiveness?

Speaker: [nai nai] [[nɔgɛnɛ]<sub>P</sub> [nɔjɔnɔk]<sub>P</sub> mala=hε k<sup>h</sup>uzilɛ]<sub>I</sub> ← MF  
 No no Nagen-SUB Nayan-OBJ<sub>I</sub> garland-OBJ<sub>O</sub>=only ask-PST.3  
 No no, Nagen asked Nayan only for a garland.

#### 3.1.1 Subjects

For the data, 3 (three) male and 2 (two) female speakers (20 to 30 years old) from Sivasagar District of Assam were recorded in the recording booth of the Phonetics and Phonology Lab, Indian Institute of

Technology Guwahati. The recording was done using a Tascam, D-100 PCM recorder in wav format at the sampling rate of 44 KHz with 16bit resolution with the help of a Shure SM10A head-worn microphone. Care was taken so that the recorded utterances were produced at a normal speech rate.

### 3.1.2 Data analysis

All the constituents from the compared clauses are measured for their pitch and duration values at P-word level using PRAAT (Boersma and Weenink 2015). Pitch values are measured at two points in each of the constituent P-words: pitch minimum ( $F_0$  min) and maximum ( $F_0$  max) were measured on the first and the last syllable of each constituent respectively (Motivation:  $L/L^*$  and  $H_P/fH^*$  are realised on the first and last syllable of P-phrase respectively). In order to tackle the inter-speaker variation, the extracted values are normalised using z-score normalisation method (Disner 1980) (Rose 1987, 1991) before running the statistical tests as per the following formula:

$$F_{0\text{ norm}} = (F_{0i} - F_{0\text{ aver}})/s$$

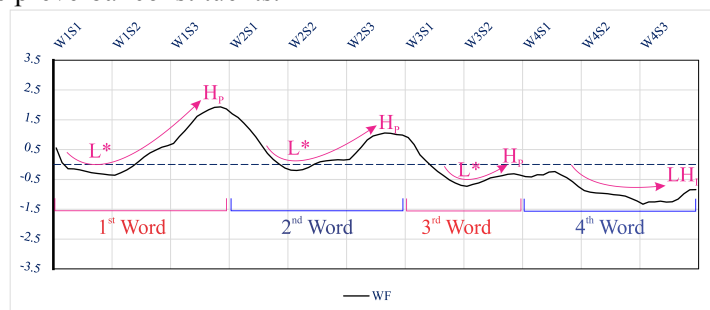
Where  $\begin{cases} F_{0i} & = & F_0 \text{ value of an individual point} \\ F_{0\text{ aver}} & = & \text{average of all the } F_0 \text{ values in a P-phrase} \\ s & = & \text{standard deviation of all } F_0 \text{ values in a P-phrase} \end{cases}$

By taking the z-score normalised pitch values as dependent variable and focused status as fixed factor, a one-way ANOVA test was conducted using StataMP13 (StataCorp 2013). A sum total of [5(expressions) x 5(speakers) x 4(focus conditions) x 3 (iterations)] 300 utterances comprise the current data size.

## 4. Findings from the previous study

### 4.1 Wide focus IPs

In our previous study, it has been demonstrated how wide focus (henceforth WF) declarative IPs demonstrate rising pitch contour ( $L^*H_P$ ) on the immediately preverbal constituent; the non-final P-phrases are also marked by  $L^*H_P$  pitch pattern (see Twaha and Mahanta (2016) for details). Time normalised contour of the utterances uttered in WF context has been displayed in Figure-1 which shows rising pitch patterns on each of the preverbal constituents.



**Figure 1** z-score normalised contour of WF declarative IPs with SOOV (Subject + Object<sub>I</sub> + Object<sub>D</sub> + Verb) construction, where all the words are trisyllabic except for the direct object, which is disyllabic.

The pitch peaks in declarative IPs are always in downstepping<sup>3</sup> order, as a consequence, the realisation of the boundary tone of the final pitch accent may not be very prominent. As can be seen in Figure-1, the rise on the third word is modestly realised. In most of the experimented sentences, the verb starts with the voiceless aspirated stop /k<sup>h</sup>/, which initiates a local phonetic effect on the pitch contour just at the beginning of the fourth word. Therefore this local phonetic jump captured in the normalised contour displayed in Figure-1 has not been assigned any phonological tone.

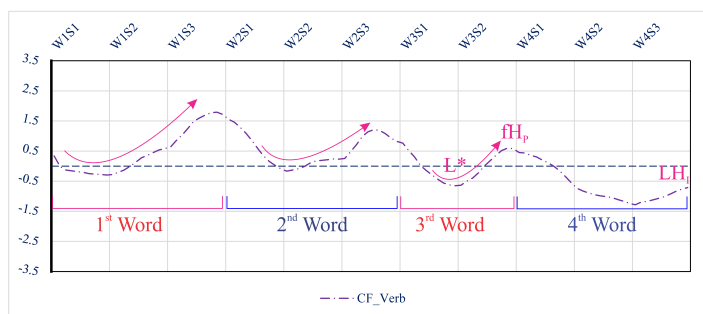
### 4.2 Contrastive focus IPs

<sup>3</sup> In SCA each succeeding P-phrase in an IP maintains lower pitch rise in comparison with the previous P-phrase. In a sequence of two P-phrases, the rise in second phrase is downstepped.



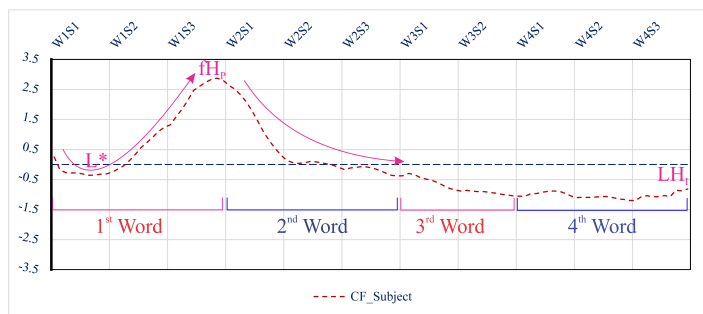
In declarative IPs with CF, the focused constituent always bears the final accent of the IP. The said constituent is designated by  $L^*fH_P$  pitch pattern, which is associated with the focused constituent at two points: low pitch accent  $L^*$  is assigned to the first syllable and focus high boundary tone  $fH_P$  aligns with final syllable. The focused constituent bearing the IP final pitch accent is characterised by greater pitch range and increased duration value. Apart from initiating a phrasing effect on the focused constituent, CF also deaccents the post-focus P-phrases (if there are any). Post-focus deaccentuation is supported by the results of the phonetic experiments conducted and reported in Twaha and Mahanta (2016). CF is highlighted in three ways in SCA: it forms P-phrase, increases the pitch value of the focused constituent and it significantly shrivels the pitch value of the sequence following it.

Figure 2 and 3 demonstrate time normalised contours of IPs with CF on the third and first word respectively. As it can be seen in Figure 2, the constituent with CF shows greater pitch rise on the focused constituent. Though CF expands the pitch span of the focused word, the downstep relation among the P-phrases is maintained within the IP: pitch peak seen on the third word is lower than the rise on the second constituent (Figure 2).



**Figure 2** z-score normalised pitch contour of the IPs bearing CF on the third constituent. Compared to Figure-1, the third word here demonstrates robust pitch rise on the third word.

The z-score normalised contour displayed in Figure 3 represents the intonational contour of the recorded IPs produced with CF on the first constituent. Due to the assignment of CF on the first constituent, the entire post-focus sequence undergoes compression as an effect of post-focus deaccentuation.



**Figure 3** z-score normalised pitch contour of the IPs bearing CF on the first constituent. Besides the greater pitch rise on the first constituent, the entire post-focus region undergoes pitch compression as a result of post-focus deaccentuation.

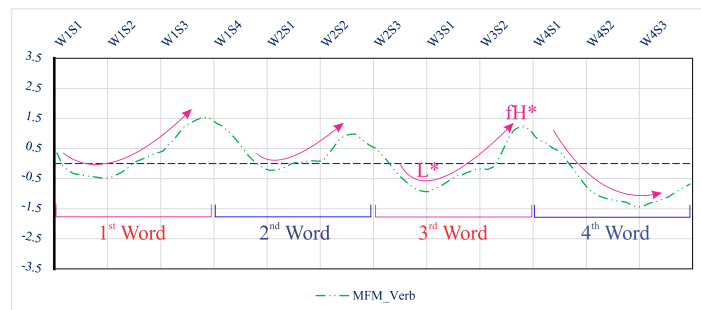
The summary of the previous studies given in this section illustrates how a constituent with CF demonstrates expanded rising pitch contour caused by  $L^*fH_P$ . In the next section, it will be shown how the focus marked with MFMs manifests itself intonationally.

## 5. Findings from the present study

The present study proposes that focused constituents hosting MFMs prosodically behave differently than when they receive CF. Superficially, the two focus types demonstrate rising contours, however at the

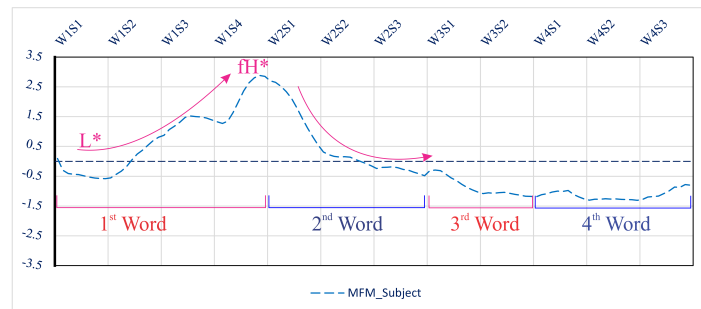
phonological level these rises have different motivations. In this study, it has been assumed that in contrast to  $L^*fH_P$  pitch contour on constituents receiving CF, in MF the pitch pattern is  $LfH^*$ . The starred tone in both the patterns designates the most prominent syllable in the respective constituents; it is also the IP final accent of the respective IPs. As mentioned earlier, constituents with CF bear  $L^*$  pitch accent on its first syllable and high focus boundary tone  $fH_P$  on the final syllable; on the other hand in MF, MFMs have been proposed to bear focus high morpho-lexical pitch accent  $fH^*$  (cf Bengali *emphatic clitics* (Lahiri and Fitzpatrick-Cole 1999)), which is preceded by a post-lexically assigned L tone realised on the first syllable of the host. The motivation behind assuming  $fH^*$  pitch accent on MFMs comes from the intonational contour displayed on MFMs. Downstepping of P-phrases, a characteristic feature of SCA declarative IPs, is obligatorily blocked by the pitch peak realised on MFMs.

Figure 4 and 5 demonstrate z-score normalised contours of IPs, where the MFM =*he* adjoins the third and first constituent respectively. As such, the constituents hosting =*he* exhibit exalted pitch peak on the MFM. In Figure 4, an expansion in pitch rise is seen on the third constituent, which hosts the MFM =*he* to its right. This rise on the said constituent is in sharp contrast with the rises seen in Figure 1 and 2 on the third constituent. In Figure 1 and 2, the downstep relation among P-phrases is maintained, whereas in Figure 4, the pitch peak on =*he* is realised higher than the one seen on the second constituent. It is the difference in phrasing pattern seen in MF that blocks the downstep normally observed in SCA declarative IPs.



**Figure 4** In this z-score normalised pitch contour, the third word hosts the MFM =*he* to its right. The rise on the MFM blocks the downstep otherwise seen in SCA declarative IPs.

In Figure 5, similar to Figure 3, the first constituent forms P-phrase and is designated by pitch rise. Following the pitch rise, the entire post-focus sequence undergoes deaccentuation, which leads to a gradual decline in the pitch contour through the sequence. Here the MFM, apart from being the most prominent syllable in the focused P-phrase, bears the final accent of the IP after which the pitch drops smoothly.



**Figure 5** In this z-score normalised pitch contour, the first word hosts the MFM =*he* to its right. MF realised on the first constituent removes all the pitch variations seen in Figure 1.

The results of statistical tests conducted to establish the phonetic difference between constituents in WF and MF conditions reveal that constituents hosting MFM show significantly expanded pitch range compared to their WF counterparts. Results displayed in Table 1 show that constituents hosting MFMs are characterised by significantly greater pitch span:  $F_0$  min goes down and  $F_0$  max goes up on the first and last syllable of the focused constituent respectively.

ITEMS ↓	VALUES ↓	WF		MF FOCUS		F ↓	p-value ↓
		Mean	Sd	Mean	Sd		
WORD-1	$F_0$ max	-.074	.84	1.23	.67	F(1, 148) = 111.64	0.00
	$F_0$ min	.43	1.07	-.37	1.09	F(1, 148) = 20.55	0.00
WORD-2	$F_0$ max	.11	.62	1.12	.53	F(1, 148) = 114.16	0.00
	$F_0$ min	.09	.71	-.95	.49	F(1, 148) = 107.68	0.00
WORD-3	$F_0$ max	-.10	.54	1.46	.50	F(1, 148) = 337.58	0.00
	$F_0$ min	.23	.89	-.40	.67	F(1, 148) = 23.69	0.00

**Table 1** Comparison of  $F_0$  min and max values on the first and last syllable of words respectively in three different positions under WF and MF conditions.

## 6. Discussion

In the above discussion comparing the outcomes of our previous study on CF (Twaha and Mahanta 2016, 2016) and those found in the present investigation, it can be seen that both CF and MF increase pitch values on the final syllable of the focused constituent. This pitch increase on the constituent with CF does not often block IP internal downstepping. Though the third constituent in Figure 2 undergoes pitch increase on the final syllable, it is lower than the peak realised on the second word. On the other hand, constituents manifesting MF always block IP internal downstep. In Figure 4, the pitch peak realised on the third word is realised higher than the one manifested on the second word. It has been assumed in this study that this kind of phonetic difference in pitch realisation on the focused constituent in CF and MF conditions is caused by the difference of phrasing ( $L^*fH_p$  and  $LfH^*$  respectively), which these two types of focus initiate. We do not hypothesise focus high boundary tone ( $fH_p$ ) on MFMs as it has been done by Khan (2008, 2014) for Bangladeshi Standard Bengali since the high tone on MFMs is always realised higher than it is on constituents with CF (compare Figure 2 and 4). We further assume that unlike EFAs in English, MFMs in SCA not only mark the prominence of its host morphologically by attaching with it, but also lends prosodic prominence to it by bearing the pitch accent of the focused phrase.

## 7. Conclusion

In this study, it has been discussed how constituents bearing MF behave differently to those with CF. The paper illustrates the way MFMs are distributed in SCA and how hosts and MFMs are organised in the variety. The focused constituent together with the MFM constitutes a P-phrase. Within this P-phrase, the MFM bears the pitch accent ( $fH^*$ ) since it is treated as the most prominent syllable of the phrase. MFMs post-lexically represent the prosodic prominence assigned to the host by bearing the final pitch accent of the IP.

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# The syntax of split: The case of Hindi and Magahi<sup>1</sup>

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## ABSTRACT

This paper provides a theoretical explanation of split construction in Hindi and Magahi, both SOV, modern Indo-Aryan languages. In both languages, all the prenominal elements can be fronted independent of the object NP. However, these elements cannot be split off from overtly Case marked object in Hindi. Magahi, on the other hand, allows split even from the Case marked objects. Furthermore, Magahi allows split from all kind of subject whereas Hindi only allows split from Dative and Instrumental subject and the subject of Unaccusative and Unergative, but not from the subject of transitive clauses. This paper provides a unified account to derive this asymmetry by adopting the theory of “freezing” effects: Once a constituent moves it becomes opaque for extraction (Wexler and Culicover 1980, Takahashi 1994, Stepanov 2007).

## 1 Introduction

This paper aims to provide a theoretical explanation of split construction in Hindi and Magahi, both SOV modern Indo-Aryan languages. The term “split” here refers to ‘discontinuity of a phrase’ (van Riemsdijk Henk 1989, Fanselow and Ćavar 2002, Fanselow and Féry 2006). For example, (1) shows the canonical order of Magahi and Hindi noun phrase where a prenominal element adjective ‘good’ and a noun ‘book’ are string adjacent. (2) shows the split construction where the subject intervenes between the adjective and the noun<sup>2</sup>.

- |         |                |                              |                |             |        |
|---------|----------------|------------------------------|----------------|-------------|--------|
| (1) (a) | ham            | <b>barhiāā</b>               | <b>kitaab</b>  | kharid-lii. |        |
|         | I[NOM]         | good                         | book           | buy-PF.1    |        |
|         |                | ‘I bought (a) good book(s).’ |                |             | Magahi |
| (b)     | māĩ=ne         | <b>achii</b>                 | <b>kitaabē</b> | kharid-īī.  |        |
|         | I=ERG          | good.F                       | book.F.PL      | buy-PF.F.PL |        |
|         |                | ‘I bought good books’        |                |             | Hindi  |
| (2) (a) | <b>barhiāā</b> | ham                          | <b>kitaab</b>  | kharid-lii. |        |
|         | good           | I[NOM]                       | book           | buy-PF.1    |        |
|         |                | ‘I bought good books’        |                |             | Magahi |
| (b)     | <b>achii</b>   | māĩ=ne                       | <b>kitaabē</b> | kharid-īī   |        |
|         | good.F         | I=ERG                        | book.F.PL      | buy-PF.F.PL |        |
|         |                | ‘I bought (a) good book(s)’  |                |             | Hindi  |

Particularly, the paper investigates the syntactic property of split from subjects and direct objects. There is an asymmetry regarding the possibility and impossibility of splitting from an object and a subject in Hindi and Magahi. This paper provides a unified account to derive this asymmetry by adopting and developing the theory of “freezing” effects: Once a constituent moves it becomes opaque for extraction (Wexler and Culicover 1980, Takahashi 1994, Stepanov 2007 and many others).

This paper is structured as follow: Section (2) presents the empirical facts of Hindi and Magahi. Section (3) presents the core assumptions and proposals that I adopt to give an account for Hindi

<sup>1</sup>The Hindi variety taken for this study is spoken in and around Delhi and the Magahi variety is spoken in and around Jehanabad and Gaya in Bihar in India.

<sup>2</sup>The split off element and the source are shown in bold face in this paper. The split off element could be topic or focus in Hindi and Magahi

and Magahi data. The first part of this section presents the three fundamental assumptions: Chain Uniformity condition, Shortest Move and the cycle principle. The second part shows how these assumptions give an account of the Hindi and Magahi facts. Section (4) concludes the paper.

## 2 Data Presentation

Both Magahi and Hindi have differential object marking (DOM) (Comrie 1989, Mohanan 1993, Singh 1994, Aissen 2003, Bhatt and Anagnostopoulou 1996, Bhatt 2007, Self 2012 and many others for Hindi). The unspecific direct objects are unmarked (henceforth unmarked object) while the specific direct objects (henceforth marked object, glossed as a DOM) are marked with overt case (Bhatt and Anagnostopoulou 1996, Bhatt 2007, Self 2012). Splitting is allowed from unmarked object in both languages as shown in (3). Although, in (3), the adjective and numeral are split off from the rest of the noun phrase, the facts are the same with other kinds of modifiers too. The whole range of prenominal elements can be fronted away from the object NP<sup>3</sup>.

- (3) (a) **caar** māĩ=ne **kele** khaa-ye  
four I=ERG banana.M.PL eat-PF.M.PL  
'I ate four bananas.' Hindi
- (b) **lambaa** māĩ=ne **laRkaa** dekh-aa  
tall I.ERG boy see-PF.M.SG  
'I saw a tall boy.' Hindi
- (c) **caar-go** ham **kelaa** khai-lii  
four-CLF I[NOM] banana eat-PF.1  
'I ate four bananas.' Magahi
- (d) **lambaa** ham **laikaa** dekh-lii  
tall I[NOM] boy saw-PF.1  
'I saw a tall boy.' Magahi

However, these prenominal elements cannot be extracted out of Hindi marked objects, as in (4).

- (4) (a) \***caar** māĩ=ne **laRkō=ko** dekh-aa.  
four I=ERG boyM.OBL.PL-DOM see.PF.M.SG  
'I saw four specific boys.'
- (b) \***lambe** māĩ=ne **aadmi=ko** dekh-aa.  
tall.OBL I=ERG man[M].SG-DOM see.PF.M.SG  
'I saw the tall man.'

Magahi, on the other hand, allows the extraction of a modifier from the marked objects as shown in (5).

- (5) (a) **tiin-go** ham **aadmi=ke** dekh-lii.  
three-CLF I[NOM] man-DOM see-PF.1  
'I saw three specific men.'
- (b) **lambaa** ham **aadmii=ke** dekh-lii.  
tall I[NOM] man-DOM see-PF.1  
'I saw the tall man.'

Consider now subjects. Magahi allows split from subject of transitive clauses. In (6), the numeral 'three' appears on the left periphery of the sentence and it is ambiguous. In one interpretation, numeral 'three' modifies the subject 'boys' and in the second interpretation, it modifies the object 'books'.

<sup>3</sup>In this paper, I concentrate on the split of a single modifier and setting aside the existence of multiple splits. However, the proposed analysis would be able to capture the facts of multiple split too.

- (6) **tiin-go** kal laik-an kitaab paṛh-kai.  
 three-CLF yesterday boy-PL book read.PF.3  
 ‘Yesterday, three boys read books.’  
 ‘Yesterday, the boys read three books.’

Splitting, however, is degraded from subject of transitive clause in Hindi as in (7). Unlike Magahi, the numeral ‘three’ cannot modify the subject ‘boys’ in (7). In (7a), the subjects have overt ergative case while in (7b) it is nominative.

- (7) (a) **tiin** kal laRkō=ne kitaabē paṛh-īi.  
 three yesterday boy.M.OBL.PL=ERG book[F].PL read-PF.F.PL  
 ‘Yesterday, the boys read three books.’  
 \*/?? ‘Yesterday, three boys read the books.’  
 (b) **tiin** kal laRkē kitaabē paṛh rahe the.  
 three yesterday boy.M.PL[NOM] book[F].PL read PROG.PL be.PST.M.PL  
 ‘Yesterday, boys were reading three books.’  
 \*/?? ‘Yesterday, three boys were reading books.’

However, both Hindi and Magahi allow a split from subjects of Unaccusative and Unergative verbs (8)-(9) and also from Dative and Instrumental subjects as shown in (10)-(11)<sup>4</sup> respectively. In most of the cases, numeral is used but again facts are the same with other kinds of modifiers.

- (8) (a) **tiin** kal **kursi-yāā** tuṭ-īi.  
 three yesterday chair-PL[NOM] break-PF.F.PL  
 ‘Yesterday, three chairs broke.’ Hindi  
 (b) **tiin-go** kal **kurisi** tuṭ ge-lai.  
 three-CLF yesterday chair[NOM] break go.PF.3  
 ‘Yesterday, three chairs broke.’ Magahi  
 (9) (a) **tiin** kal **laRke** duaR-e.  
 three yesterday boy.M.PL[NOM] run.PF.M.PL  
 ‘Three boys run.’ Hindi  
 (b) **tiin-go** kal **laik-an** duaR-lai.  
 three-CLF yesterday boy-PL[NOM] run-PF.3  
 ‘Three boys run.’ Magahi  
 (10) (a) **lambe-vaale** kal **laRke=ko** bukhaar th-aa.  
 tall-PRT yesterday boy.M.PL=DAT fever be.PST-M.SG  
 ‘yesterday, the tall boy had a fever.’ Hindi  
 (b) **lam-kaa** kal **laikwaa=ke** bokhaar ha-lai.  
 tall-PRT yesterday boys=DOM fever be-PRF.3  
 ‘Yesterday, the tall boy had a fever.’ Magahi  
 (11) (a) **tiin** kal **laRkō=se** chalaā nahii ga-yaa.  
 three yesterday boy.M.OBL.PL=INST walk.PF.M.SG NEG go-PF.M.SG  
 ‘Yesterday, the three boys were not able to walk.’ Hindi  
 (b) **tiin-go** kal **laik-an=se** chalal na ge-lai.  
 three-CLF yesterday boy-PL=INST walk.PF NEG go-PF.3  
 ‘Yesterday, the three boys were not able to walk.’ Magahi

Summing up this section, we looked at the core cases of splitting phenomena from a direct object and a subject in Hindi and Magahi. Split is possible from the unmarked object in both languages. Any

<sup>4</sup>We will see later that not all dative and instrumental subjects allow split in Hindi though. When there is a marked object in these constructions, split is not allowed. We will also see that it is not true that nominative and ergative subjects do not allow split in Hindi. When the object is oblique splitting is allowed. These will be a crucial point for my analysis later on.

prenominal constituent can be split off. However, Hindi and Magahi behave differently with respect to split from the marked object. Hindi does not allow splitting from the marked objects whereas Magahi does. Furthermore, Magahi allows split from all kind of subjects. Hindi, however, does not allow split from subject of transitive clauses. The overall generalization is presented in Table 1.

		Magahi	Hindi
Object	NP	yes	yes
	NP-DOM	yes	no
Subject	NOM of transitive	yes	no
	ERG of transitive	NA	no
	Subject of unaccusative	yes	yes
	Subject of unergative	yes	yes
	Dative subject	yes	yes
	Instrumental subject	yes	yes

Table-1: (Im)possibility of split

### 3 Towards an analysis

The section presents an analysis to capture the asymmetry that is observed in the last section regarding splitting from an object and subject in Hindi and Magahi. Section (3.1) presents my proposals and assumptions that lead to an account for Magahi and Hindi data in section (3.2).

#### 3.1 Proposals and assumptions

To capture Hindi and Magahi facts, I make central use of the notion of “*Freezing effect*” (Wexler and Culicover 1980, Takahashi 1994, Stepanov 2007 and many others), the idea that *once a constituent moves it becomes opaque for extraction*. The freezing phenomenon is illustrated in (12)-(13). Extraction from the subject in (12) is possible because it occupies the base position i.e. Spec, vP. However, extraction is impossible in (13) because the subject moves to Spec, TP.

(12) [<sub>CP</sub> Who<sub>i</sub> [<sub>TP</sub> there [<sub>T</sub> is [<sub>vP</sub> [<sub>DP</sub> a picture of  $t_i$  ] [<sub>V</sub> [<sub>PP</sub> on the wall?]]]]]]]

(13) \*/? [<sub>CP</sub> Who<sub>j</sub> [<sub>TP</sub> [<sub>DP</sub> a picture of  $t_j$  ]<sub>i</sub> [<sub>T</sub> does [<sub>vP</sub>  $t_i$  [<sub>V</sub> hang [<sub>PP</sub> on the wall?]]]]]]]

I adopt three fundamental assumptions: ‘the chain uniformity condition’ (14), and ‘Shortest Move’ condition (15) from Takahashi (1994)’s account of the freezing effects and ‘the cycle principle’ as (16) from Chomsky (1994). The chain uniformity condition rules out any movement that disrupts the uniform status of the chain. To achieve this uniformity within the chain, D. Takahashi (1994) proposes a “Uniformity Corollary of Adjunction (UCA)”, a simplified version of that is stated in (14b). UCA disallows any adjunction to a part of a nontrivial chain. The principle of shortest move, on the other hand, only allows an element to move to the target position by a series of short successive adjunctions to maximal projections. This forces an element to reach its target position via successive cyclic movement. The successive cyclic movement in this theory is not a result of feature checking, but an outcome of the obligation that all chain links be as short as possible. The cycle principle, on the other hand, assumes an ordering of transformations in a derivation. According to this principle, the movement that involves the smallest domain is applied first i.e. movement targets the smallest domain first.

- (14) a. Chain Uniformity condition  
Chains must be uniform  
b. Uniformity Corollary on Adjunction (UCA)  
Adjunction to a part of a nontrivial chain is not allowed.

(15) Shortest Move: Make the shortest move.

(16) The cycle principle

Movement targets the smallest domain first.



### 3.2 Deriving the facts

In this section, we will look at the syntactic property of objects and subjects that distinguish Hindi from Magahi. We see that marked objects move out of VP in Hindi but not in Magahi. The unmarked objects, on the other hand, do not move out of VP in either language. We will see that how the UCA, the shortest move and the cycle principles block splitting from moved (marked) DOs. The unmoved (unmarked) DOs allow split because these principles are not violated by them.

Regarding subjects, we will see that splitting from a subject is not allowed in Hindi unless the object is oblique or there is no object in the clause. To capture this fact, I propose that transitive clauses which have two arguments with a structural case have an EPP feature in Hindi. Thus, there is a movement of subject in these cases and split is not allowed. However, splitting from all kind of subjects are allowed in Magahi. To capture this fact, I propose that there is no EPP feature on T at all in Magahi. Thus, there is no movement to Spec,TP in Magahi. The subject stays vP internally in Magahi. Consequentially, Magahi allows split from a subject of all type of clauses.

#### 3.2.1 The asymmetry on splitting from an object

The behavior of marked objects in Hindi is reminiscent of object shift (OS) in Germanic and Icelandic (Bobaljik and Jonas 1996). The crucial evidence that marked objects moves out of VP comes from the double object construction (Bhatt and Anagnostopoulou 1996). The base order for the double object construction can be taken as Subject-IO-DO-Verb. That is, the higher (first) NP is interpreted as a GOAL and the second NP is interpreted as a THEME (17). However, when both objects are case marked, the DO must precede the IO i.e. the higher (first) one is always interpreted as a THEME as in (18). Another evidence for OS of DO in Hindi comes from an example such as (19)- a pronoun which refers to human must be *-ko* marked and OS is forced.

- (17) Ram=ne Anita=ko<sub>[G]</sub> chhiṭṭhii<sub>[T]</sub> bhej-ii  
 Ram[M]=ERG Anita[F]=DAT letter send-PF.F.SG  
 ‘Ram sent a letter to Anita.’ (from Bhatt and Anagnostopoulou 1996)

- (18) (a) Ram=ne chhiṭṭhii=ko<sub>[T]</sub> Anita=ko<sub>[G]</sub> bhej-aa  
 Ram[M]=ERG letter[F]=DOM Anita[F]=DAT send-PF.M.SG  
 ‘Ram sent a letter to Anita.’ (from Bhatt and Anagnostopoulou 1996)

- (b) baabaa=ne sanṭi=ko<sub>[T]</sub> banṭi=ko<sub>[G]</sub> de di-yaa.  
 grandfather[M]=ERG Santee[M]=DOM Bantee[M]=DAT give give-PF.M.SG  
 ‘Grandfather gave Santee to Bantee.’

- (c) baabaa=ne banṭi=ko<sub>[T]</sub> sanṭi=ko<sub>[G]</sub> de di-yaa.  
 grandfather[M]=ERG Bantee[M]=DOM Santee[M]=DAT give give-PF.M.SG  
 ‘Grandfather gave Bantee to Santee.’

- (19) (a) jusuf=ne us=ko<sub>i</sub> nina=ko t<sub>i</sub> di-yaa.  
 Yusuf[M]=ERG he.OBL=DOM Nina[F]=DAT give-PF.M.SG  
 ‘Yusuf gave him/her/that to Nina.’ (from Bhatt 2007)

- (b) jusuf=ne nina=ko vo di-yaa.  
 Yusuf[M]=ERG Nina[F]=DAT DEM give-PF.M.SG  
 ‘Yusuf gave \*him/\*her/that to Nina.’ (from Bhatt 2007)

Like in Hindi, IO precedes DO in the canonical order in Magahi too. However, contrary to Hindi, in Magahi, when both objects are case marked, the higher one is interpreted as GOAL (20).

- (20) (a) baabaa sanṭi-aa=ke banṭi-aa=ke de de-l-thii.  
 grandfather Santee-FM=DAT Bantee-FM=DOM give give-PRF-3  
 ‘Grandfather gave Banty to Santee.’

- (b) baabaa banṭi-aa=ke sanṭi-aa=ke de de-l-thii.  
 grandfather Bantee-FM=DAT Santee.FM=DOM give give-PF-3  
 ‘Grandfather gave Santee to Bantee.’

Furthermore, unlike Hindi, the DO pronoun which refers to human follows the IO in Magahi, as in (21).

- (21)    *santi-aa    banti-aa=ke        hamnii=ke de    de-l-kai.*  
          Santee-FM Bantee.FM=DAT we=DOM    give give-PF-3  
          ‘Santee gave us to Bantee.’

From the above data, we can conclude that the marked DO moves out of VP in Hindi but it stays VP-internal in Magahi.

Now, let us see how (14), UCA, in conjunction with (15), Shortest Move and (16), the cycle principle rules out splitting from the marked object in Hindi. Consider the derivation of example (22a). Given the vP-internal subject hypothesis, the subject ‘the boys’ is base generated at Spec, vP and the object ‘three books’ is base generated as a sister of V as shown in (22b). In accordance with object shift (OS), the marked object moved from object position to the external Spec, vP, leaving behind the copy as in (22c). The numeral ‘three’ is then extracted from the higher copy. In accordance with the Shortest Move, it first must adjoin to the maximal projection of DP dominating it, as shown in (22d). However, this movement is ruled out by UCA, because it involves adjunction to part of a nontrivial chain. Given UCA, then, the numeral ‘three’ must skip adjunction to DP and adjoin to the next higher available projection vP as shown in (22e). However, this movement violates the Shortest Move because it skips the first potential landing site i.e. adjunction to dominating DP. Thus, numeral ‘three’ cannot reach its target position without violating the condition UCA or Shortest Move. The extraction is also not possible from the lower copy at stage (22c) because then similar consideration applies. The extraction is also not possible from the lower copy at stage (22b) because then similar consideration applies: adjunction of numeral ‘three’ to the maximal projection of DP violates the UCA whereas skipping this step and adjoining to VoiceP would violate the Shortest Move. One might also argue that at stage (22b) the split takes place first before the OS. But the derivation is ruled out by (16), the cycle principle, because the OS targets a smaller domain i.e. vP than the split which targets the larger domain i.e. CP. Thus, splitting the DP before OS violates the condition (14) and/or (15)/(16).

- (22) (a) \**tiin        kal        laRkõ=ne        kitaabõ=ko        paRaa.*  
          three    yesterday boy.OBL.PL=ERG book.OBL.PL=DOM read.PF.3P.M.
- (b) [<sub>VP</sub> [<sub>DP-sub</sub> boys-NE [<sub>VP</sub> [<sub>DP-obj</sub> three books-KO] [<sub>v</sub> read]]]]].
- (c) [<sub>VP</sub> [<sub>DP</sub> three books-KO] [<sub>VP</sub> [<sub>DP</sub> boys-NE [<sub>VP</sub> [<sub>DP</sub> three books-KO] [<sub>v</sub> read]]]]]]].  
          Object shift
- (d) \* [<sub>VP</sub> [<sub>DP</sub> three [<sub>DP</sub> three books-KO] [<sub>VP</sub> [<sub>DP</sub> boys-NE [<sub>VP</sub> [<sub>DP</sub> three books-KO] [<sub>v</sub> read]]]]]]].  
          Violates the UCA
- (e) \* [<sub>VP</sub> three [<sub>VP</sub> [<sub>DP</sub> three books-KO] [<sub>VP</sub> [<sub>DP</sub> boys-NE [<sub>VP</sub> [<sub>DP</sub> three books-KO] [<sub>v</sub> read]]]]]]].  
          Violates the shortest move

The split is possible from unmarked objects in both Hindi and Magahi and from marked objects in Magahi because these objects do not undergo movement. Neither conditions (14), (15) and (16) violate in these cases.

### 3.2.2 The asymmetry on splitting from a Subject

Now, let us move to the subject. Consider the Hindi examples (23)-(24), first. In (23), the subject bears ergative case. But only (23b) allows split. In (24), the subject bears Nominative case. But only (24c) allows split. The difference between (23a) and (23b) is that in (23a) both arguments are structurally case marked whereas in (23b) only the subject is structurally case marked. The object

bears an oblique case. The same is true for (24a & b) and (24c). In (24a & b) both arguments are structurally case marked whereas in (24c) only the subject is structurally case marked. The object bears an oblique case. Furthermore, (25)-(27) allow splitting from subjects. These clauses do not have any object at all. (25) is a dative construction. In (26), the verb is unaccusative while in (27) the verb is unergative. Magahi, on the other hand, allows splitting from all these cases (Magahi data are not mentioned here because of the length constraint, but see example (8)-(11) in section (2)).

- (23) (a) \*/?? **tiin** kal **laRkō=ne** kitaabē paṛh-īi.  
 three yesterday boy.M.OBL.PL=ERG book.PL read-PF.F.PL  
 ‘Yesterday, three boys read books.’
- (b) **tiin** kal **laRkō=ne** raam=kii madad k-i.  
 three yesterday boy.M.OBL.PL=ERG Ram=GEN help do-PF.F.SG  
 ‘Three boys helped Ram, yesterday.’
- (24) (a) \*/?? **tiin** kal **laRke** kitaabō=ko paṛh rahe th-e.  
 three yesterday boy.M.PL[NOM] book.OBL.PL=DOM read PROG.M.PL be.PST-M.PL  
 ‘Yesterday, three boys were reading books.’
- (b) \*/?? **tiin** kal **laRke** kitaabē paṛh rahe th-e.  
 three yesterday boy.M.PL[NOM] book.PL read PROG.M.PL be.PST-M.PL  
 ‘Yesterday, three boys were reading books.’
- (c) **tiin** kal **laRke** mujh=se mil-e.  
 three yesterday boy.M.PL[NOM] I.OBL=INST meet.PST-M.PL  
 ‘Three boys met me, yesterday.’
- (25) **unke** kal **laRke=ko** bukhaar th-aa.  
 he.OBL.GEN yesterday boy.M.OBL.PL=DAT fever be.PST-M.SG  
 ‘Yesterday, his son had fever.’
- (26) **tiin** kal **kursiyāā** tuṭ-īi.  
 three yesterday chair.F.PL[NOM] break-PF.F.PL  
 ‘Three chairs broke, yesterday’
- (27) **tiin** kal **laRke** dauR-e.  
 three yesterday boy.M.PL[NOM] run-PF.M.PL  
 ‘Three boys ran, yesterday.’

This asymmetry, within the terms of our analysis, can be captured assuming that in (23a) and (24a & b) the subject moves to Spec, TP, but in (23b), (24c), (25), (26) and (27) it does not. In Magahi, on the other hand there is no movement of subject to Spec, TP. The independent evidence for the hypothesis that splitting is not allowed from a subject when it moves to Spec, TP comes from (28), a dative construction with a marked object. Unlike (25), splitting is degraded in (28). The reason for this degradation is that (28) the object is marked. We saw in the last section that marked DOs undergo OS. Thus, in (28), OS forces the marked object to move to the edge of vP. However, this derivation yields wrong word order: DO-Sub-V. The acceptable sentence is obtained when dative subject moves and precedes the marked object. Since, there is a movement of subject in (28), splitting is not allowed<sup>5</sup>

- (28) \*/?? **tiin** kal **bacchō=ko** kitaabō=ko paṛhnaa  
 three yesterday boy.M.OBL.PL=DAT book.F.OBL.PL=DOM read.INF  
 chaahiye th-aa.  
 should be-PRF.M.SG  
 ‘Yesterday, three boys should have read the books.’

<sup>5</sup>(28) is a bi-clausal structural where embedded infinitival clause is subcategorized as subject of the main verb. However, this does not effect our analysis.

Now, the question is what theoretical mechanism forces the subject to move to the Spec, TP in (23a) and (24a & b)? All these above examples can be described in term of (29).

- (29) Splitting from a subject is not allowed in Hindi unless the object is oblique or there is no object in the clause.

To incorporate this empirical generalization into the theory, I propose the following parametric condition (30) that states that transitive clauses (clauses where two arguments are merged in the vP domain and get a structural case) bear an EPP feature. Hindi says YES to (30) whereas Magahi says NO.

- (30) Transitive clauses (clauses where two arguments are merged in the vP domain and get a structural case) bear an EPP feature. (NO: Magahi; YES: Hindi)

Now, let us go back to the examples. (23a) and (24a & b) do not allow split because these are transitive clauses in terms of (30). Thus, it has EPP feature on T that forces the subject to move to the Spec, TP. As a result, splitting is impossible from the subject because the UCA or Shortest Move or the cycle principle is violated. (23b), (24c), (25), (26) and (27) allow splitting of the subject. The reason is that there is no EPP feature on T in these clauses, given in (30). Thus, there is no movement of subject to the Spec, TP. As a result, splitting is allowed for the subject because the UCA, the Shortest Move and the cycle principle do not apply.

We captured the asymmetry of (23)-(27) with the help of principle (30). But, what sort of principle is it? The principle relates externalization of an argument with Case feature. In this sense, it seems similar to Alexiadou and Anagnostopoulou (2006)'s proposal: the subject-in-situ generalization (SSG), given in (31).

- (31) The subject-in-situ generalization (SSG)

By Spell-Out, vP can contain only one argument with a structural Case feature.

However, (30) and (31) have different properties. As (30), (31) also relates externalization of an argument with Case feature, but (31) does not make any discrimination between the subject and the object. (31) is satisfied as long as one of the arguments moves out of vP. In this respect, it takes the interpretation of EPP as a general principle, and not as a property of T. (30), on the other hand, relates the case feature to EPP on T. Thus argument externalization only affects the subject. In this sense, it takes EPP as a property of T. (30), unlike (31), could not be universal. It is parameterized as we have seen: Hindi says YES to it, but Magahi says NO.

## 4 Conclusion

In this paper, I examined the syntactic phenomenon of split construction in Hindi and Magahi. Particularly, I investigated the property of split from subjects and direct objects (DO). Hindi allows split from unmarked DOs but not from marked DOs. Magahi, on the other hand, allows split from both marked and unmarked DOs. Furthermore, Magahi allows split from subject of all kind of clauses whereas Hindi only allows split from Dative and Instrumental subject and the subject of Unaccusative and Unergative, but not from the subject of transitive clauses. In order to provide a unified account, I followed the *“freezing effects”* (Wexler and Culicover 1980, Takahashi 1994, Stepanov 2007 and many others). I adopted *“Chain Uniformity condition”* and *“shortest move”* from Takahashi (1994) and *“the cycle principle”* from Chomsky (1964) to block the extraction of an element from a moved constituent. I showed that marked objects in Hindi move out of VP whereas there is no such movement in Magahi. Therefore, the UCA, the principle of shortest move and the cycle principle apply to the marked DOs in Hindi. Since there is no movement in Magahi, these principles are not applied in Magahi. I extended this analysis to the domain of subjects and argue that subjects in Magahi always stay vP internally giving rise to the possibility of split from any type of subject whereas in Hindi in two cases, subject moves to the Spec, TP. One, when OS takes place, it forces subject to move to Spec TP as in the case of dative construction with marked object and second when two arguments are merged in the vP domain and get a structural case, the subject

moves to the Spec, TP. I showed that these are the two cases in Hindi where split from a subject is not allowed.

**Learnability issue: Acquisition and EPP:** In this paper, the asymmetry between Hindi and Magahi is captured based on the notion of EPP. I argued that Magahi does not have EPP feature at all. For Hindi, I have argued that certain clauses have EPP feature but others do not. This sounds like a problem for learnability. However, I shown that whenever, T has EPP feature in Hindi it is a well defined syntactic environment. Thus, I argue that proposed system is quite learnable. I propose that a correlation between object shift and availability of Spec, TP as a position gives a child the linguistic clue that Spec, TP is required. In other words, a child may learn on the basis of evidence from the OS that spec, TP is licensed as a subject position in Hindi. Furthermore, a child may also learn that Spec TP is licensed as a subject position in Hindi when there are two arguments in vP internally and both are structurally case marked.

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# Deriving subject and antisubject orientation

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## ABSTRACT

This paper investigates subject and antisubject orientation in Hindi-Urdu. We argue that the locus of these two binding constraints is Voice<sup>0</sup>, the functional head responsible for binding the anaphoric possessor *apnaa*, wherein the binder of *apnaa* must raise to [Spec, VoiceP]. Subject orientation reduces to the locality of A-movement. Antisubject orientation is the result of a preference to use the anaphor *apnaa* whenever possible. We show that this proposal extends to dative–nominative structures, where the complementarity of subject and antisubject orientation for anaphors and pronouns breaks down. Finally, we examine speaker variation of quantifier binding with *uskaa* in dative–nominative structures.

## 1 Introduction

In Standard Binding Theory, the distribution of anaphors and pronouns is dictated by Conditions A and B, which state nominal distribution in terms of c-command. However, in many languages, **c-command alone is insufficient** to account for nominal distribution. In this paper, we investigate such a case in Hindi-Urdu: anaphoric and pronominal possessors. The anaphoric possessor *apnaa* must corefer with the subject; it is SUBJECT ORIENTED. The pronominal possessor *uskaa* cannot corefer with the subject; it is ANTISUBJECT ORIENTED. Subject and antisubject orientation do not fall under the purview of Conditions A and B. We will argue that the locus of these constraints is Voice<sup>0</sup>, coupled with a preference to use the anaphor *apnaa* whenever possible. This will correctly predict the binding possibilities in simplex clauses, in addition to dative–nominative structures.

## 2 Subject and antisubject orientation

Binding Conditions A, B, and C are all active in Hindi-Urdu (Dayal 1994). Subject and antisubject orientation are *in addition* to the standard binding constraints. In this section, we review subject and antisubject orientation of anaphors and pronouns in Hindi-Urdu. We then show how the complementarity of these two constraints breaks down in dative–nominative structures.

### 2.1 Anaphors and pronouns

Anaphors in Hindi-Urdu are SUBJECT ORIENTED: they must be bound by the subject of the clause (1). Pronouns, on the other hand, are ANTISUBJECT ORIENTED: they cannot corefer with the subject (2). We use the term “subject” descriptively, as we will later see that it is a misnomer in light of dative–nominative structures. Moreover, in (1) and (2), note that both ordinary and quantifier binding are given and that word order permutations do not affect the binding possibilities.<sup>2</sup>

- (1) {anu-ne<sub>i</sub> / har larke-ne<sub>i</sub>} **apne-aap-ko**<sub>*i*/<sub>*j*</sub></sub> maar-aa *Anaphor*  
Anu-ERG every boy-ERG ANA -DOM hit-PFV  
'Anu<sub>i</sub> / Every boy<sub>i</sub> hit himself<sub>*i*/<sub>*j*</sub></sub>'
- (2) {anu-ne<sub>i</sub> / har larke-ne<sub>i</sub>} **us-ko**<sub>*i*/<sub>*j*</sub></sub> maar-aa *Pronoun*  
Anu-ERG every boy-ERG PRON-DOM hit-PFV  
'Anu<sub>i</sub> / Every boy<sub>i</sub> hit him<sub>*i*/<sub>*j*</sub></sub>'

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<sup>2</sup>All judgements are by Sakshi Bhatia, unless otherwise indicated.

## 2.2 Anaphoric and pronominal possessors

Additionally, Hindi-Urdu has both an anaphoric possessor *apnaa* and a pronominal possessor *uskaa*, whose behaviour mirrors their nonpossessive counterparts, as outlined in section 2.1. What makes the anaphoric and pronominal possessors an interesting empirical domain is that they can both in principle occur in a nominative argument. We will see this in dative–nominative structures. This is not possible with the ordinary anaphor *apne-aap* because of the Anaphor Agreement Effect, which prohibits anaphors in positions construed with agreement (3) (Rizzi 1990, Woolford 1999).

### (3) Anaphoric Agreement Effect

- |  |  |
|--|--|
| <p>a. *<b>apne-aap</b><sub>i</sub> anu-ko<sub>i</sub> maar-ega<br/>         ANA Anu-DOM hit-FUT<br/> <i>Intended:</i> ‘Anu<sub>i</sub> will hit himself<sub>i</sub>’ (cf. 1)</p> | <p>b. *anu-ko<sub>i</sub> <b>apne-aap</b><sub>i</sub> pasand hē<br/>         Anu-DAT ANA like be.PRS<br/> <i>Intended:</i> ‘Anu<sub>i</sub> likes himself<sub>i</sub>’</p> |
|--|--|

Like the anaphor, the anaphoric possessor must corefer with the subject (for most speakers); it is subject oriented. This is shown for transitive and ditransitives in (4). The fact that we are dealing with binding and not simple coreference is illustrated through the availability of quantifier binding.

### (4) Anaphoric possessor is subject oriented

- |  |   |
|--|---|
| <p>a. {raam-ne<sub>i</sub> / har laṛke-ne<sub>i</sub>} [<b>apnii</b><sub>i/*j</sub> kitaab] paṛh-ii<br/>         Ram-ERG every boy-ERG ANA.GEN book read-PFV<br/>         ‘Ram<sub>i</sub> / Every boy<sub>i</sub> read his<sub>i/*j</sub> book’</p> | <p>b. {raam-ne<sub>i</sub> / har laṛke-ne<sub>i</sub>} anu-ko<sub>j</sub> [<b>apnii</b><sub>i/%j/*k</sub> kitaab] dii<br/>         Ram-ERG every boy-ERG Anu-DAT ANA.GEN book give.PFV<br/>         ‘Ram<sub>i</sub> / Every boy<sub>i</sub> gave Anu<sub>j</sub> his<sub>i/%j/*k</sub> book’</p> |
|--|---|

In contrast to the anaphor and the anaphoric possessor, but like the pronoun, the pronominal possessor cannot corefer with the subject; it is antisubject oriented (5). In (5), the impossibility of quantifier binding from subject position shows that genuine binding is unavailable.

### (5) Pronominal possessor is antisubject oriented

- |  |   |
|--|---|
| <p>a. {raam-ne<sub>i</sub> / har laṛke-ne<sub>i</sub>}<br/>         Ram-ERG every boy-ERG<br/>         [<b>us-kii</b><sub>*i/j</sub> kitaab] paṛh-ii<br/>         PRON-GEN book read-PFV<br/>         ‘Ram<sub>i</sub> / Every boy<sub>i</sub> read his<sub>*i/j</sub> book’</p> | <p>b. {raam-ne<sub>i</sub> / har laṛke-ne<sub>i</sub>} anu-ko<sub>j</sub><br/>         Ram-ERG every boy-ERG Anu-DAT<br/>         [<b>us-kii</b><sub>*i/j/k</sub> kitaab] dii<br/>         PRON-GEN book give.PFV<br/>         ‘Ram<sub>i</sub> / Every boy<sub>i</sub> gave Anu<sub>j</sub> his<sub>*i/j/k</sub> book’</p> |
|--|---|

Furthermore, quantifiers not in subject position can bind the pronominal possessor, but not the anaphoric possessor (6).<sup>3</sup>

### (6) Nonsubject quantifier requires pronominal possessor

- raam-ne<sub>i</sub> [har laṛke-ko ]<sub>j</sub> [{**us-kii**<sub>\*i/j/k</sub> / **apnii**<sub>i/%j/\*k</sub>} kitaab] dii  
 Ram-ERG every boy-DAT PRON-GEN ANA.GEN book give.PFV  
 ‘Ram<sub>i</sub> gave every boy<sub>j</sub> USKAA<sub>\*i/j/k</sub> / APNAA<sub>i/%j/\*k</sub> book’

In general, like their nonpossessive counterparts, word order permutations do not affect the binding possibilities of *apnaa* or *uskaa* in ordinary transitive and ditransitive structures (7)–(8) (Dayal 1994). However, even though scrambling cannot ameliorate antisubject orientation, it is possible to scramble a DP above the subject to bind *uskaa* in the subject itself (10) (Mahajan 1990, Dayal 1994). Such an option is not available with *apnaa* (9).

<sup>3</sup>We use USKAA and APNAA in the translation to disambiguate when necessary, as both are translated as ‘him/her’.

- (7) *Anaphoric possessor*  
 [ **apnii**<sub>*i/\*j*</sub> kitaab ] raam-ne<sub>*i*</sub> t paṛh-ii  
 ANA.GEN book Ram-ERG read-PFV  
 ‘Ram<sub>*i*</sub> read his<sub>*i/\*j*</sub> book’ (cf. 4a)
- (8) *Pronominal possessor*  
 [ **us-kii**<sub>*\*i/j*</sub> kitaab ] raam-ne<sub>*i*</sub> t paṛh-ii  
 PRON-GEN book Ram-ERG read-PFV  
 ‘Ram<sub>*i*</sub> read his<sub>*\*i/j*</sub> book’ (cf. 5a)
- (9) *Anaphoric possessor*  
 \* [ har laṛke-ko ]<sub>*i*</sub> [ **apnii**<sub>*i*</sub> behen-ne ]  
 every boy-DOM ANA.GEN sister-ERG  
 t maar-aa  
 hit-PFV  
 Intended: ‘For every boy *x*, *x*’s sister hit *x*’
- (10) *Pronominal possessor*  
 [ har laṛke-ko ]<sub>*i*</sub> [ **us-kii**<sub>*i*</sub> behen-ne ]  
 every boy-DOM PRON-GEN sister-ERG  
 t maar-aa  
 hit-PFV  
 ‘For every boy *x*, *x*’s sister hit *x*’

Summarising the discussion thus far: The anaphoric possessor and the pronominal possessor are in COMPLEMENTARY DISTRIBUTION in ordinary transitive and ditransitive structures. However, we will see in the next section that this complementarity does not extend to dative–nominative structures in Hindi-Urdu.

### 2.3 Dative–nominative structures

In dative–nominative structures, the experiencer is marked with dative and the theme is marked with nominative (11). Standardly, the dative experiencer is considered the “subject” and the nominative theme is considered the “object”. However, we will see that this labelling is misleading.

- (11) [ **raam-ko** ]<sub>DAT</sub> [ **miiraa** ]<sub>NOM</sub> dikh-ii  
 Ram-DAT Mira appear-PFV  
 ‘Ram saw Mira’ (lit. Mira became visible to Ram)

Crucially, the complementarity of *uskaa* and *apnaa*, as discussed in the previous section, does not extend to dative–nominative structures. The dative can serve as the antecedent of either *apnaa* or *uskaa* (12). Likewise, the nominative can also serve as the antecedent of either *apnaa* or *uskaa* (13).

- (12) **raam-ko**<sub>*i*</sub> [ { **apnii**<sub>*i/\*j*</sub> / **us-kii**<sub>*i/j*</sub> } behen ] dikh-ii *Dative binding into nominative*  
 Ram-DAT ANA.GEN PRON-GEN sister appear-PFV  
 ‘Ram<sub>*i*</sub> saw APNAA<sub>*i/\*j*</sub> / USKAA<sub>*i/j*</sub> sister’
- (13) **raam**<sub>*i*</sub> [ { **apnii**<sub>*i/\*j*</sub> / **us-kii**<sub>*i/j*</sub> } behen-ko ] dikh-aa *Nominative binding into dative*  
 Ram ANA.GEN PRON-GEN sister-DAT appear-PFV  
 ‘Ram<sub>*i*</sub> was seen by APNAA<sub>*i/\*j*</sub> / USKAA<sub>*i/j*</sub> sister’

As reported in Reese (2002), although coreference with *uskaa* is possible, quantifier binding can only occur with *apnaa*, never with *uskaa* (14). The judgment reported in (14) is surprising given that scrambling should be able to feed binding *uskaa*; see section 2.2.

- (14) *Quantifier binding requires anaphoric possessor*  
 [ **har laṛke-ko** ]<sub>*i*</sub> [ { **apnii**<sub>*i/\*j*</sub> / **us-kii**<sub>*\*i/j*</sub> } behen ] dikh-ii  
 every boy-DAT ANA.GEN PRON-GEN sister appear-PFV  
 ‘Every boy<sub>*i*</sub> saw APNAA<sub>*i/\*j*</sub> / USKAA<sub>*\*i/j*</sub> sister’ [modelled after Reese 2002]



The data discussed so far are summarised in (15). In the next section, we present our proposal.

(15) *Anaphoric and pronominal possessors in Hindi-Urdu*

	Elsewhere		Dative–nominative	
	<i>apnaa</i>	<i>uskaa</i>	<i>apnaa</i>	<i>uskaa</i>
Condition A	✓	✗	✓	✗
Subject antecedent	✓	✗	✓	✓
Nonsubject antecedent	✗	✓	✓	✓
Quantifier binding	✓	✓	✓	✗

### 3 Proposal

In this section, we lay out our proposal that the binding of *apnaa* is facilitated by Voice<sup>0</sup>, which requires the antecedent DP to raise to [Spec, VoiceP] in order for *apnaa* to obtain a bound interpretation. Sections 3.1 and 3.2 discuss subject orientation and antisubject orientation respectively. Section 3.3 then extends the proposal to dative–nominative structures.

#### 3.1 Subject orientation

We propose that the binding of *apnaa* is facilitated by Voice<sup>0</sup>, which requires the antecedent DP to raise to [Spec, VoiceP] to obtain a bound interpretation. The subject orientation of *apnaa* thus follows from the locality of this movement only being able to target the highest DP, i.e. the subject.

Following Kratzer (2009), we adopt the theory that binding is facilitated by verbal functional heads. These heads are what introduce semantic binders ( $\lambda$ -operators), as INDEX FEATURES, rather than the antecedent DPs themselves. In particular, we propose that Voice<sup>0</sup> may bear such an index feature. This feature matches the index borne by the antecedent DP and *apnaa*. Crucially, it attracts the antecedent DP to [Spec, VoiceP]. At LF, the index feature is interpreted as a  $\lambda$ -abstraction over that index. Thus, it abstracts over both the trace of the antecedent DP and the anaphor *apnaa*, yielding a “reflexive” predicate (Reinhart and Reuland 1993). The antecedent DP, occupying [Spec, VoiceP], then saturates the  $\lambda$ -abstraction. This proposal is schematised in (16).<sup>4</sup>

$$\begin{array}{l}
 \text{(16)} \quad \left[ \text{VoiceP } \mathbf{XP}_r \text{ Voice}_{[r]}^0 \left[ {}_{v\text{P}} \mathbf{t}_r v^0 \left[ \text{VP } \left[ \text{DP } \mathbf{apnaa}_r \text{ NP } \right] \text{V}^0 \right] \right] \right] \\
 \rightsquigarrow \text{LF: } \left[ \text{VoiceP } \mathbf{XP} \text{ Voice}^0 \lambda r \left[ {}_{v\text{P}} \mathbf{r} v^0 \left[ \text{VP } \left[ \text{DP } \mathbf{r} \text{ NP } \right] \text{V}^0 \right] \right] \right]
 \end{array}$$

The semantic derivation of (16) proceeds as in (17).<sup>5</sup> First, the DP containing *apnaa* composes with the verb V<sup>0</sup> via Function Application (17b). The index *r* at this point in the derivation is dependent on the variable assignment function *g*. Second, the VP composes with *v*<sup>0</sup>, which introduces the external argument, via Event Identification (17d) (following Kratzer 1996). Third, the index feature borne by Voice<sup>0</sup> is interpreted as a  $\lambda$ -abstraction over the index *r* (17e). Fourth, the XP in [Spec, VoiceP] saturates the  $\lambda$ -abstraction introduced by the index feature (17f).

(17) *Semantic derivation of (16)*

- a.  $\llbracket \text{DP} \rrbracket^g = \text{POSS}(g(r))(\llbracket \text{NP} \rrbracket)$  (where *g* is the assignment)  
 (the entity *r*'s NP)
- b.  $\llbracket \text{VP} \rrbracket^g = \lambda e . \text{V}(\text{POSS}(g(r))(\llbracket \text{NP} \rrbracket))(e)$  (via FA)  
 (an event of V-ing *r*'s NP)

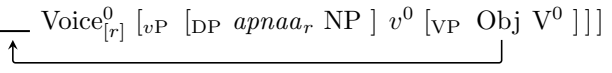
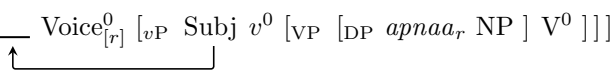
<sup>4</sup>To simplify exposition, we assume that Voice<sup>0</sup> does not assign a thematic role; rather, this is handled by *v*<sup>0</sup>.

<sup>5</sup>FA = Function Application, EI = Event Identification, PA = Predicate Abstraction, POSS = Possessor

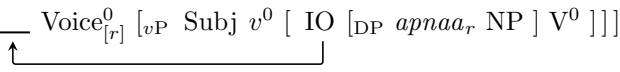
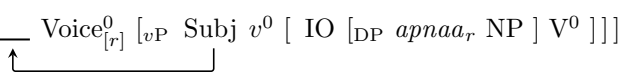
- c.  $\llbracket v^0 \rrbracket^g = \lambda x \lambda e . \text{AGENT}(x)(e)$   
(an event whose agent is  $x$ )
- d.  $\llbracket vP \rrbracket^g = \lambda e . \text{AGENT}(g(r))(e) \wedge V(\text{POSS}(g(r))(\llbracket \text{NP} \rrbracket))(e)$   
(an event of V-ing  $r$ 's NP whose agent is  $r$ ) (via EI)
- e.  $\llbracket \lambda r . vP \rrbracket^g = \lambda r \lambda e . \text{AGENT}(r)(e) \wedge V(\text{POSS}(r)(\llbracket \text{NP} \rrbracket))(e)$   
( $\lambda r$  an event of V-ing  $r$ 's NP whose agent is  $r$ ) (via PA)
- f.  $\llbracket \text{VoiceP} \rrbracket^g = \lambda e . \text{AGENT}(\llbracket \text{XP} \rrbracket)(e) \wedge V(\text{POSS}(\llbracket \text{XP} \rrbracket)(\llbracket \text{NP} \rrbracket))(e)$   
(an event of V-ing XP's NP whose agent is XP) (via FA)

As a consequence of  $\text{Voice}^0$  facilitating the binding of *apnaa*, its binder *must* raise to [Spec, VoiceP]. In (16)–(17), the actual semantic binding comes from the  $\lambda$ -abstraction that binds two variables corresponding to the antecedent DP's trace and the anaphor respectively. If the antecedent DP failed to raise to [Spec, VoiceP], then (i) the  $\lambda$ -abstraction corresponding to the index feature would not bind both positions, and hence the LF would not be a semantically bound configuration, and (ii) the antecedent DP would not saturate the variable corresponding to the anaphor.

Movement to [Spec, VoiceP] is standard A-movement such that only the highest DP in the structure is eligible. In ordinary circumstances, the highest DP will be the subject. For example, in a transitive clause, locality will block the object from raising over the subject to [Spec, VoiceP], thus correctly preventing the object from binding *apnaa* in the subject (18).

- (18) a.  $*[\text{VoiceP} \text{ --- } \text{Voice}_{[r]}^0 [\text{vP } [\text{DP } \textit{apnaa}_r \text{ NP} ] \text{v}^0 [\text{VP } \text{Obj } \text{V}^0 ]]]$   

- b.  $[\text{VoiceP} \text{ --- } \text{Voice}_{[r]}^0 [\text{vP } \text{Subj } \text{v}^0 [\text{VP } [\text{DP } \textit{apnaa}_r \text{ NP} ] \text{V}^0 ]]]$   


In the same vein, locality blocks the indirect object in a ditransitive from raising over the subject to [Spec, VoiceP], thus correctly preventing the indirect object from binding *apnaa* (19).

- (19) a.  $*[\text{VoiceP} \text{ --- } \text{Voice}_{[r]}^0 [\text{vP } \text{Subj } \text{v}^0 [ \text{IO } [\text{DP } \textit{apnaa}_r \text{ NP} ] \text{V}^0 ]]]$   

- b.  $[\text{VoiceP} \text{ --- } \text{Voice}_{[r]}^0 [\text{vP } \text{Subj } \text{v}^0 [ \text{IO } [\text{DP } \textit{apnaa}_r \text{ NP} ] \text{V}^0 ]]]$   


Therefore, the standard locality of A-movement derives the subject orientation of *apnaa* under our proposal that its binding is facilitated by  $\text{Voice}^0$ .

There are two independent reasons to believe that  $\text{Voice}^0$  is responsible for binding *apnaa*.<sup>6</sup> The first reason comes from quirky (nominative) subjects. Poole (2015) argues that a DP acquires “subjecthood” properties, e.g. being PRO, by cyclically moving through a series of A-positions. One of these subjecthood positions is [Spec, VoiceP] for binding subject oriented anaphors. He argues that the crosslinguistic variation in the behaviour of quirky subjects follows from the possibility that they may not move to the highest subjecthood position in a language, even when canonical nominative subjects do. First, this shows that functional heads are in part responsible for the distribution of subjecthood properties, including binding subject oriented anaphors. Second, because our proposal is compatible with his, this paper helps to situate Hindi-Urdu in the broader typology of subjecthood.

The second reason for identifying  $\text{Voice}^0$  as the locus of binding in Hindi-Urdu comes from fake indexicals, which constitute the original evidence presented in Kratzer (2009) for functional heads handling binding (see also references therein). She documents instances in German of fake indexicals

<sup>6</sup>It is worth mentioning that moving to [Spec, VoiceP] is a necessary condition for binding *apnaa*, but nothing rules out additional conditions being necessary for its felicity.

where first- and second-person pronouns can receive a bound-variable interpretation only when the  $\varphi$ -features of the verb match those of the pronoun. Compare (20a) with (20b).

- (20) a.  $\varphi$ -agreement  $\rightarrow$  Bound reading possible  
 Wir sind die einzigen, die **unseren** Sohn versorg-**en**  
 we are the only.ones who.PL 1PL.POSS.ACC son take.care.of-1/3PL  
 ‘We are the only ones who are taking care of our son’
- b. No  $\varphi$ -agreement  $\rightarrow$  Bound reading not possible  
 Ich bin der einzige, der **meinen** Sohn versorg-**t**  
 I am the only.one who.SG 1SG.POSS.ACC son take.care.of-3SG  
 ‘I am the only one who is taking care of my son’ [Kratzer 2009:191]

Under standard assumptions, because AGREE is involved in binding, functional heads must also be involved. Finally, accepting that a functional head is responsible for binding *apnaa*, Voice<sup>0</sup> is the lowest possible head in the functional sequence that could do so. This makes it a natural choice.

### 3.2 Antisubject orientation

We propose that antisubject orientation is the result of a preference to use the anaphor *apnaa* whenever the derivation would allow. We call this the Anaphoric Preference (21).

- (21) ANAPHORIC PREFERENCE  
 Whenever the binder has moved or could have moved to [Spec, VoiceP], use *apnaa*.

In an ordinary transitive clause, the subject will have moved to [Spec, VoiceP], as argued above. Therefore, according to (21), this bleeds the ability to use a coreferring pronominal possessor (22).

- (22) [VoiceP  $\overbrace{\text{---}}^{\text{Voice}_{[r]}^0}$  [vP DP  $v^0$  [VP [DP {*apnaa\_r* / \**uskaa\_r*} NP ] V<sup>0</sup> ]]]

According to (21), there is no general prohibition on coreference with a pronoun from a *c*-commanding position in Hindi-Urdu. There is only a preference to bind using the anaphor *apnaa* whenever possible. This will be important in the next section for dative–nominative structures.

The Anaphoric Preference is in the spirit of the idea in Reinhart and Reuland (1993) that the complementarity of anaphors and pronouns is the result of the requirement to use an anaphor whenever the predicate is reflexive and vice versa. Although properly exploring how their proposal might be modified to account for Hindi-Urdu *apnaa* is beyond the scope of this paper, we will mention an idea in this direction at the end of the paper.

### 3.3 Dative–nominative structures

Recall from section 2.3 that in dative–nominative structures, either the dative or the nominative can corefer with the anaphor *apnaa* or the pronoun *uskaa*, but quantifier binding requires *apnaa*. We propose the following structure in (23) for dative–nominative predicates: the dative is an external argument introduced by  $v_{\text{EXP}}^0$  and the nominative is an internal argument of the verb itself.

- (23) Structure of a dative–nominative predicate  
 [VoiceP Voice<sup>0</sup> [vP DAT  $v_{\text{EXP}}^0$  [VP NOM V<sup>0</sup> ]]]

The evidence for treating the nominative as an internal argument of the verb comes from instances where the nominative argument determines the particular interpretation of the verb (24)–(25).

- (24) **raam-ko** *bhvuukh* lag rahii he  
 Ram-DAT hunger contact PROG be.PRS.SG  
 ‘Ram is feeling hungry’ [Bhatt 2003:6]
- (25) **larke-ko** *coṭ* lag-ii  
 boy-DAT wound contact-PFV  
 ‘The boy was hurt’



(30) *Speaker variation in dative–nominative structures*

	Group A		Group B	
	<i>apnaa</i>	<i>uskaa</i>	<i>apnaa</i>	<i>uskaa</i>
Condition A	✓	✗	✓	✗
Subject antecedent	✓	✓	✓	✓
Nonsubject antecedent	✓	✓	✓	✓
Quantifier binding	✓	✗	✓	✓

We propose that Group B speakers, who allow binding of *uskaa* in (28a) and (28b), have access to an *impoverished* form of the complex anaphor *uskaa-apnaa*, which masquerades as *uskaa*. The complex anaphor *uskaa-apnaa* must be bound, but crucially is not subject oriented and thus cannot be bound by the subject (31). The behaviour of *uskaa-apnaa* is summarised in (32).

- (31) a. \*anu-ne<sub>i</sub> [uskii-apnii<sub>i/j</sub> kitaab] paṛh-ii  
 Anu-ERG COMPLEX.GEN book read-PFV  
*Intended:* ‘Anu<sub>i</sub> read his<sub>i</sub> book’
- b. ram-ne<sub>i</sub> mohan-ko<sub>j</sub> [uskii-apnii<sub>\*i/j/\*k</sub> kitaab] dii  
 Ram-ERG Mohan-DAT COMPLEX.GEN book give.PFV  
 ‘Ram<sub>i</sub> gave Mohan<sub>j</sub> his<sub>\*i/j/\*k</sub> book’

(32) *Anaphoric and pronominal possessors in Hindi-Urdu*

	<i>apnaa</i>	<i>uskaa</i>	<i>uskaa-apnaa</i>
Condition A	✓	✗	✓
Subject antecedent	✓	✗	✗
Nonsubject antecedent	✗	✓	✓
Quantifier binding	✓	✓	✓

According to our impoverishment proposal, the sentence in (28b), where the nominative binds into the dative, has the underlying structure in (33) for Group B speakers.

- (33) *Underlying form of (28b) for Group B speakers*  
 [har laṛkaa]<sub>i</sub> [uskii-apnii<sub>i</sub> behen-ko ] dikh-aa  
 every boy COMPLEX.GEN sister-DAT appear-PFV  
 ‘Every boy<sub>i</sub> was seen by his<sub>i</sub> sister’

The derivation of (33) proceeds as follows: First, the dative containing *uskaa-apnaa* moves to [Spec, VoiceP]. Second, the nominative moves above [Spec, VoiceP] to bind *uskaa-apnaa*. Finally, *uskaa-apnaa* is impoverished as *uskaa* in the morphology. This derivation is schematised in (34).

- (34) [ NOM ... [VoiceP [ *uskaa-apnaa* NP ]<sub>DAT</sub> Voice<sup>0</sup> [<sub>vP</sub> ... t<sub>DAT</sub> t<sub>NOM</sub> V<sup>0</sup> ] ] ]

Under our analysis, and the proposals in section 3, the ability to use *uskaa-apnaa* requires one of the following two conditions to be satisfied: (i) its binder not be in [Spec, VoiceP], because this would force using *apnaa* given the Anaphoric Preference, or (ii) the DP containing *uskaa-apnaa* itself move to [Spec, VoiceP], from where it can subsequently be bound by a higher (scrambled) DP. The latter condition precludes the use of *apnaa* in place of *uskaa-apnaa*. Crucially, in ordinary transitive and ditransitive structures, movement to [Spec, VoiceP] is *deterministic* such that it is always the

highest argument that raises to [Spec, VoiceP]. This categorically prohibits the subject from binding *uskaa-apnaa* in either structure; hence the antisubject orientation of *uskaa-apnaa*. Thus, in transitive structures, *uskaa-apnaa* is ungrammatical in object position because there is no available binder (31a), and, in ditransitive structures, only the goal can bind *uskaa-apnaa* (31b). Moreover, it is possible for *uskaa-apnaa* to be in the subject itself and be bound by a scrambled object (35b) because the subject moves to [Spec, VoiceP] and hence satisfies the second condition.

- (35) a. \***[uske-apne<sub>i</sub>    maalik-ne    ] [har    naukar-ko ]<sub>i</sub>** bulaa-yaa  
           COMPLEX.GEN employer-ERG    every servant-DOM    call-PFV  
           Intended: ‘His<sub>i</sub> employer called every servant<sub>i</sub>’
- b. **[har    naukar-ko ]<sub>i</sub> [uske-apne<sub>i</sub>    maalik-ne    ] t** bulaa-yaa  
           every servant-DOM    COMPLEX.GEN employer-ERG    call-PFV  
           ‘For every servant *x*, *x*’s employer called *x*’

(35b) is analogous to what happens in a dative–nominative structure. In dative–nominative structures, because movement to [Spec, Voice] is not deterministic due to reversibility, *uskaa-apnaa* in either the dative or nominative argument can move to [Spec, VoiceP]. This allows the other argument to scramble above [Spec, VoiceP] and bind *uskaa-apnaa*. This begets the question of why a similar derivation is not available for *uskaa* in dative–nominative structures.

We leave this question open for future research, but suggest an avenue of thinking: While *uskaa* and *apnaa* are in competition, *uskaa-apnaa* and *apnaa* are not. A derivation with *apnaa* is thus always preferred over one with bound *uskaa* in dative–nominative structures because such a derivation is always available, given reversibility. Coreference with *uskaa* is permitted, which does not require proper binding; see section 3.2. No such preference exists for *apnaa* over *uskaa-apnaa*, permitting a derivation like (34). Thus, the problem reduces to how one implements competition; see section 5.1.

## 5 Conclusion

We discussed subject and antisubject orientation of anaphoric and pronominal possessors respectively in Hindi-Urdu. Crucially, these two constraints on binding do not fall under the purview of Standard Binding Theory (Chomsky 1981). We proposed that the locus of subject and antisubject orientation is Voice<sup>0</sup>, the functional head responsible for binding the anaphoric possessor *apnaa* wherein the binder of *apnaa* must move to [Spec, VoiceP]. Subject orientation reduces to the locality of A-movement: only the highest DP, typically the external argument, is eligible for movement to [Spec, VoiceP]. Antisubject orientation is the result of the Anaphoric Preference to use *apnaa* whenever possible:

- (36) ANAPHORIC PREFERENCE  
       Whenever the binder has moved or could have moved to [Spec, VoiceP], use *apnaa*.

Following Davison (2004), we argued that dative–nominative structures are *reversible*. This allows either argument to bind *apnaa* and, given (36), bleeds the ability to bind using the pronoun *uskaa*, thereby deriving the non-complementarity of anaphoric and pronominal possessors in dative–nominative structures. Finally, we considered interspeaker variation: some Hindi-Urdu speakers allow a bound interpretation of *uskaa* in dative–nominative structures. We proposed that these speakers have access to an impoverished form of the complex anaphor *uskaa-apnaa*, which must be bound, but crucially is not subject oriented.

### 5.1 Further questions and extensions

Reinhart and Reuland (1993) define the requirement to use an anaphor in terms of coargumenthood: if the two arguments of a predicate are the same, the predicate is reflexive and thus must occur with an anaphor. This raises the question of how the anaphor requirement ought to be relaxed from strict coargument to account for languages like Hindi-Urdu, where possessors (i.e. non-coarguments) fall

under the purview of the binding system as well. Ideally, this should be done without sacrificing the otherwise widespread empirical coverage of Reinhart and Reuland’s (1993)’s theory. The mobility of possessors in Hindi-Urdu might play a role (37).

- (37) [kis sheher-kii]<sub>i</sub> raam [t<sub>i</sub> lar̥kiyō-se] mil-aa  
 which city-GEN Ram girls-COM meet-PFV  
 ‘Which city was it that Ram met the girls from?’ [Bhatia et al. 2011]

Bhatia et al. (2011) have shown that, with respect to the mobility of possessors in particular, Hindi-Urdu patterns as an NP language, according to the diagnostics of Bošković (2008). Moreover, the connection between being an NP language and having anaphoric possessors has been explored in Despić (2015), though not within the binding framework of Reinhart and Reuland (1993). Therefore, this provides a promising direction for deriving the Anaphoric Preference in Hindi-Urdu.

Finally, a second point of speaker variation concerns the preference but not strict requirement of subject orientation for some Hindi-Urdu speakers. This raises the empirical question of whether this point of variation and the ability to bind using *uskaa* in dative–nominative structures correlate. If the two covary, it would suggest that they have a common source.

### Acknowledgments

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## The Perfect Nominative

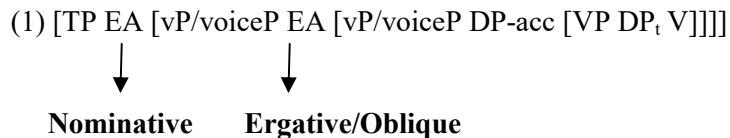
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### ABSTRACT

Western Indo-Aryan languages are widely known to host ergative subjects in the perfective. However, there is very little discussion on the optional inclusion of nominative subjects with perfect unergatives. This paper highlights such variation data from two WIALs Punjabi and Gujarati, along with the structural similarities and differences between their transitives and unergatives. It proposes that the optional nominative in the perfective is indicative of a full-phi T head selection, necessitated by case-competition between the two arguments of the unergative at the edge of vP.

## 1 Introduction

This paper presents novel data on unergative structures in many Western Indo Aryan languages/WIALs with optional nominative subjects in an otherwise pre-dominantly ergative alignment in the perfective. Given the obligatory absence of nominative subjects in perfect, transitive structures, this optional inclusion of the nominative is theoretically significant as it exposes unique structural characteristics of unergatives. The literature is divided on the transitive/non-transitive nature of unergatives, with some (Bobaljik 1993, Mahajan 1987) positing an underlying transitive structure for them, while some others (cf. Preminger 2012) conceptualizing them as intransitive forms. We add to this debate by illustrating here that unergatives in many WIALs such as Punjabi and Gujarati are underlying transitives with distinctive VP level properties that force their cognate DP objects to move to the specifier of vP. The consequence of this obligatory movement is case competition between the two arguments at the edge of vP. With the internal argument receiving a structural accusative from v, the external argument is then forced to receive an inherent ergative/oblique from v/voice or a structural nominative from T. Schematically (1).



The paper is organized thus: in section 2, we present evidence of the similarities and the differences between Punjabi transitives and unergatives. A possible analysis is provided in section 3. Following this, in section 4, we extend the discussion to Gujarati. The final section discusses the implications of our account for optionality in minimalist grammar and concludes the paper.

## 2 The Punjabi unergative puzzle

Punjabi is a person based split ergative language in the perfective aspect (Bhatia 1993, Bhatt 2007, Butt and Deo 2001, Chandra, Kaur and Udaar, in print). In the transitive domain, 1<sup>st</sup>/2<sup>nd</sup> person subjects remain unmarked and are valued oblique (cf. Chandra and Kaur 2014, Kaur 2015), while 3<sup>rd</sup> person subjects are obligatorily ergative marked. This is illustrated in example (2).

- (2) maĩ/tuu/o=ne                      rotti                      khaaddii                      sii  
1.sg.obl/2.sg.obl/3.sg=erg      bread.f.sg              eat.perf.f.sg              be.past.3.sg  
'I/you/(s)he ate bread.'



Subjects of unaccusatives however are invariably nominative, as demonstrated in (3).

- (3) maĩ/tuu/o                      diggeyaa                      sãã/saĩ/sii  
 1.sg.nom/2.sg.nom/3.sg.nom    fall.perf.m.sg                be.past.1.sg/2.sg/3.sg  
 ‘I/you/(s)he fell.’

Unergatives, on the other hand, show variation with respect to ergative case marking on the subject in the perfective. The person based split attested in the transitive is observed in the unergative domain too such that 1<sup>st</sup>/2<sup>nd</sup> person subjects are marked oblique (see Chandra and Kaur, 2014 for a Part-triggered case-assignment) and the 3<sup>rd</sup> person subject gets ergative marked (4). However, unergatives manifest an additional option wherein all 1<sup>st</sup>/2<sup>nd</sup> and 3<sup>rd</sup> person subjects get nominative valued, as in (5). We seek an explanation here for the differential unergative subject marking in Punjabi.

- (4) maĩ/tuu/o=ne                      hasii                      hassii                      sii  
 1.sg.obl/2.sg.obl/3.sg=erg        laugh.f.sg                laugh.perf.f.sg        be.past.3.sg  
 ‘I/you/(s)he laughed a laugh.’

- (5) maĩ/tuu/o                      hasii                      hassii                      sãã/saĩ/sii  
 1.sg.nom/2.sg.nom/3.sg.nom        laugh.f.sg                laugh.perf.f.sg        be.past.1.sg/2.sg/3.sg  
 ‘I/you/(s)he laughed a laugh.’

We begin with illustrating that unergative and transitive verbs are quite alike structurally. For one, unergatives can combine with transitive light verbs (6)<sup>1</sup>. In addition, the cognate object of an unergative resembles a transitive object as it can be modified with an adjective and can trigger agreement on the verbal auxiliary complex, as in (7).

- (6) o=ne/o                      hasii                      hass                      dittii  
 3.sg=erg/3.sg.nom(f)                laughter.f.sg                laugh                      give.perf.f.sg  
 ‘(S)he laughed a laugh.’

- (7) o=ne/o                      pyaar-ii                      hasii                      hassii  
 3.sg=erg/3.sg.nom(f)                lovely-f.sg                laughter.f.sg                laugh.perf.f.sg  
 ‘(S)he laughed a lovely laughter.’

Despite these similarities, unergatives differ from transitive verbs. While a transitive verb in combination with (and also without) a transitive light verb has an obligatory ergative subject (8), the unergative verb with a transitive light verb continues to manifest an optional ergative on the subject, as in (9).

- (8) o=ne /\*o                      kamm    kar                      ditaa                      sii  
 3.sg=erg/\*3.sg.nom                work    do                      give.perf.m.sg        be.past.3.sg  
 ‘(S)he did the work.’

<sup>1</sup> Unergatives can also combine with unaccusative verbs, as in (i). With Cinque (2004), we consider these verbs to be functional restructuring verbs that extend the verbal domain, resulting in the obligatory assignment of nominative on the subject.

i. kuRii    nacc                      nacc paayii  
 girl.nom    dance.m.sg    dance    be.able.perf.f.sg  
 ‘The girl was able to dance a dance.’

- (9) o=ne/o                    hass                    dittaa                    sii  
       3.sg=erg/3.sg.nom    laugh                    give.perf.m.sg        be.past.3.sg  
       ‘(S)he laughed.’

### 3 A possible analysis

Based on the similarities between transitive and unergative predicates in Punjabi, we posit that unergatives in the language have an internal as well as an external argument like their transitive counterparts. This is illustrated in (10).

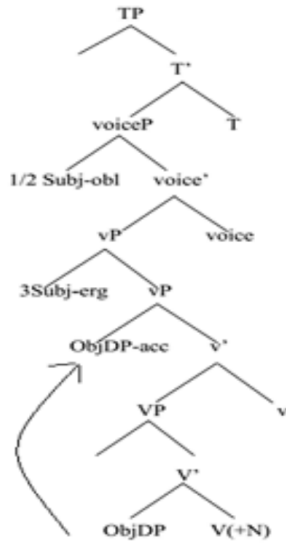
- (10) [vP EA [VP IA V]]

However, the nature of the VP containing the object varies across the two verb classes resulting in their differences. Specifically, we claim with Gallego (2012) that the underlying nominal root of an unergative and its cognate object start off as a single DP. The nominal root incorporates into the V head forming a V+N structure, while the cognate object raises to the edge of DP. Consider the schematic representation in (11).

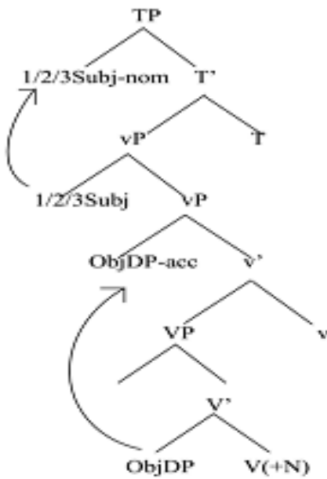
- (11) [[DP . . [sc√N Cognate-object ]] V-N]
- 

We additionally posit that the lexical V head in Punjabi unergatives, due to the incorporation of the nominal root loses its verbal properties. This prevents incorporation of the object DP into the verbal head (in the sense of Baker 1985, Baker, Johnson and Roberts 1989), resulting in the latter’s failure to be licensed in situ. The object DP raises to the edge of vP which already hosts the external argument. In the specifier of vP, the object receives a structural accusative from the v head and values its number and gender phi features. The external argument, hosted in the outer specifier of vP has two case options. It can either receive an inherent ergative from the v head if it is 3<sup>rd</sup> person; a 1<sup>st</sup>/2<sup>nd</sup> person subject must raise to voiceP to value its person feature and receives an oblique (12). Alternatively, all 1<sup>st</sup>/2<sup>nd</sup> and 3<sup>rd</sup> person external arguments move to the edge of TP to receive a structural nominative. This is illustrated in (13).

(12)



(13)



Punjabi transitives therefore differ from unergatives in that the V head in transitives retains its verbal properties. As a consequence, it is able to value the object as accusative in situ, in combination with the v head. There is no case-competition between the subject and the object at the specifier of vP, resulting in the subject obligatorily receiving an ergative/oblique. The nominalised V head of unergatives, on the other hand, intervenes in a long distance licensing of the object, which is then forced to raise to the specifier of vP. This leads to case competition between the two arguments, forcing optional nominative on the subject. What this analysis suggests is that a full phi T head is introduced in the perfective only when the case requirements of arguments are not fulfilled in a lower structure. Optional nominative is therefore only possible with unergatives.

#### 4 Extending the discussion to other WIALs

In this section, we note that the variation in subject case marking observed with unergatives is not just restricted to Punjabi, but extends to other WIALs as well. To start, let us take Hindi-Urdu, where certain unergative predicates (with or without a light verb) manifest optional ergative marking on the subject (see Mohanan 1994, Mahajan 2012). Consider (14) and (15).

(14) raam (=ne) khāāsaa  
 Ram (=erg) cough.perf.m.sg  
 ‘Ram coughed.’ (based on Mohanan, 1994)

(15) raam (=ne) khāās diyaa  
 Ram (=erg) cough give.perf.m.sg  
 ‘Ram coughed.’

In addition to the above discussed facts, we observe that the optional ergative case marking on the unergative verb is found even in the presence of an overt cognate object. This is demonstrated in (16) and (17). Transitive verbs, in contrast, do not manifest optionality, and their subjects are obligatorily marked ergative, as in (18).

(16) maĩ=ne/tuu=ne/us=ne uucii hasii hasii  
 1.sg=erg/2.sg=erg/3.sg=erg loud laughter.f.sg laugh.perf.f.sg  
 ‘I/you/(s)he laughed a loud laughter.’

(17) maĩ/tuu/vo uucii hasii hasaa  
 1.sg.nom/2.sg.nom/3.sg.nom loud laughter.f.sg laugh.perf.m.sg  
 ‘I/you/he laughed a loud laughter.’

(18) us=ne/\*vo kitaab likhii  
 3.sg=erg/\*3.sg.nom book.f.sg write.perf.f.sg  
 ‘(S)he wrote a book.’

Gujarati (Saurashtra variant) displays similar patterns. Unergatives in Gujarati also manifest optionality with regard to ergative case marking on the subject in the presence of an overt cognate object, as shown in (19) and (20). The subject of a transitive verb, on the other hand, is obligatorily ergative, as illustrated in (21)<sup>2</sup>.

<sup>2</sup> Like Punjabi, Gujarati unergatives can also combine with both transitive and unaccusative light verbs as in (i) - (ii).

i. ame hasi hasi didhi hati  
 1.pl laughter laugh give be.past.f.sg  
 ‘We laughed a laugh.’

ii. ame hasi hasi pariya  
 1.pl laughter laugh fell.past.pl  
 ‘We laughed a laugh.’

However, in combination with a transitive light verb ‘give’, the subject is obligatorily ergative (iii).

iii. me/\*huu hasi hasi didhi hati  
 1.sg.erg/1.sg.nom laughter laugh give be.past.f.sg  
 ‘I laughed a laugh.’

- (19) ame/tame                      motii    hasii                      hasi                      hati  
 1.pl.erg/2.pl.erg              loud    laughter                  laugh.perf.f.sg              be.past.f.sg  
 ‘We/you laughed a loud laugh.’
- (20) ame/tame                      motii    hasii                      hasyo                      hato  
 1.pl.nom/2.pl.nom              loud    laughter                  laugh.perf.m.sg              be.past.m.sg  
 ‘We/you laughed a loud laugh.’
- (21) te=Ne/\*te                      copaRii    lakhii  
 3.sg=erg/\*3.sg.nom              book.f.sg    write.perf.f.sg  
 ‘He wrote a book.’

Gujarati is a person and number based split ergative language wherein all transitive subjects except 1<sup>st</sup>/2<sup>nd</sup> person plural ones are ergative marked in the perfective (Deo and Sharma 2006, Bhatt 2007). Notwithstanding the feature based split in the transitive domain, unergative subjects in the language exhibit optionality with regard to case marking like their Hindi-Urdu and Punjabi counterparts.

## 5 Conclusion

To conclude, we have shown here that the presence of an optional nominative for WIAL unergatives in the perfective is indicative of an underlying structural difference between these predicates and transitives. A nominative valuing T is introduced into the unergative structure because of obligatory cognate object movement to the specifier of vP. However, this structure is optional, existing alongside the alternative where an inherent ergative case is assigned to the external argument by the theta-assigning v head.

If this analysis is on the right track, we have another case of true optionality in syntax (à la Biberauer and Richards 2006), with two alternative structures co-existing without any noticeable semantic distinction. Optionality is permissible in narrow syntax when case/licensing requirements are not met through typical operations or relations at lower phase levels.

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## Clitic blocking as a side-effect of 1<sup>st</sup>/2<sup>nd</sup> person licensing: The case of -suu in Punjabi

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### ABSTRACT

The 3<sup>rd</sup> person object clitic –suu in Punjabi is blocked with 1<sup>st</sup>/2<sup>nd</sup> subjects, but not 3<sup>rd</sup> subjects. Presenting these novel facts, this paper explains blocking effects on -suu as a side-effect of the person licensing requirements of 1<sup>st</sup>/2<sup>nd</sup> subjects. I propose that –suu is licensed at FP, to which it moves via the Part/T head. In a derivation with 1<sup>st</sup>/2<sup>nd</sup> subjects, this movement is impeded due to mismatching person features on the licensing Part head. Conversely, in a structure with 3<sup>rd</sup> subjects, there is no 1<sup>st</sup>/2<sup>nd</sup> person feature bearing PartP to obstruct the clitic’s movement.

### 1 Introduction

Punjabi<sup>1</sup> has 3<sup>rd</sup> person ‘argument replacing morphemes’ that occur attached to the verb (Akhtar 1997, Butt 2007)<sup>2</sup>. Consider the following examples where the 3<sup>rd</sup> person ergative subject in (1) has been replaced by -suu in (2).

(1) karan=ne    roTTii            khaddii  
      karan=erg   bread.f.sg        eat.perf.f.sg  
      ‘Karan ate bread.’

(2) roTTii                      khaddii=suu  
      bread.f.sg                eat.perf.f.sg=3sg  
      ‘(S)he ate bread.’

Similarly, a 3<sup>rd</sup> person object can also be replaced by–suu. This is shown in (3)-(4), for the 3<sup>rd</sup> person object ‘girl’.

(3) karan=ne    kuRii=nuu    vekhyaa  
      Karan=erg   girl=nuu        see.perf.m.sg  
      ‘Karan saw the girl.’

(4) karan=ne    vekhyaa=suu  
      Karan=erg   see.perf.m.sg=3sg  
      ‘Karan saw him/her.’

However, the construction with –suu in the presence of a 3<sup>rd</sup> person subject in (4) becomes ungrammatical if the subject is 1<sup>st</sup>/2<sup>nd</sup> person, as illustrated in (5).

(5) \*maī/tuu                    vekhyaa=suu  
      1.sg.obl/2.sg.obl    see.perf.m.sg=3sg  
      ‘I/you saw him/her.’

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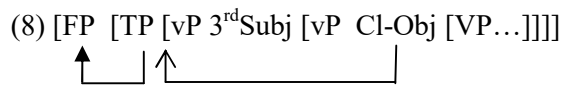
<sup>1</sup> The variety of Punjabi discussed in this work is spoken in Kanpur, Uttar Pradesh.

<sup>2</sup> The language also has 2<sup>nd</sup> person singular and plural argument replacing morphemes *ii* and *je*. However, I do not consider them for this study since these forms are ambiguous with regard to their clitic versus agreement status. For more discussion on the said forms, see Akhtar (1997), Butt (2007) and Kaur (in prep.)

The ungrammaticality of (5) is interesting since there is no restriction on the presence of a 3<sup>rd</sup> person full pronominal object with a 1<sup>st</sup>/2<sup>nd</sup> person subject (6).

- (6) maĩ/tuu                    o=nuu        vekhyaa  
       1.sg.obl/2.sg.obl  3.sg=nuu    see.perf.m.sg  
       ‘I/you saw him/her.’

This paper attempts to explain the blocking effect on –suu in (5) as following from the person licensing requirements of the 1<sup>st</sup>/2<sup>nd</sup> subjects. Specifically, I argue that –suu is licensed at FP (in the sense of Uriagereka 1995) to which it must climb via Part(icipant)/T(ense) heads. However, this licensing is obstructed in a derivation with 1<sup>st</sup>/2<sup>nd</sup> subjects. I assume with Chandra and Kaur (2014), and Kaur (2015) that 1<sup>st</sup>/2<sup>nd</sup> perfective subjects in the language are licensed at PartP, a +1/+2 person valued head located between TP and vP. Given the presence of PartP, movement of the 3<sup>rd</sup> person clitic –suu to FP via the person valued Part head results in a mismatch of features, preventing further clitic climbing and licensing. This is represented schematically in (7). On the other hand, a 3<sup>rd</sup> person subject does not have any person licensing requirement, which in turn prevents a PartP from projecting. This allows the clitic to raise to FP without any mismatch of features and get licensed (8).



The paper is organized as follows. In section 2, I introduce the 3<sup>rd</sup> person morpheme under investigation (–suu) and establish that it is a clitic (as opposed to an affix). Employing insights from Butt (2007), section 3 provides an account of –suu licensing. Following this, in section 4, I provide a feature-mismatch based explanation for the ban on –suu with 1<sup>st</sup>/2<sup>nd</sup> person subjects. Section 5 concludes the paper.

## 2 On –suu as a clitic

To understand the nature and licensing of –suu, I begin with probing into its clitic versus affix status (cf. Zwicky and Pullum 1983, Arregi and Nevins 2008, Preminger 2009, Kramer 2010, Baker 2012). To elaborate, across many languages, phi features are represented twice in the structure: once on the noun phrase that bears them and once on a morpheme that attaches itself either to the verb. This second instance of the phi features can either be an agreement affix or clitic. While the two bear resemblance in that they are verbal morphemes, they are different entities. An agreement affix obtains on the verb as a consequence of a formal Agree relation (à la Chomsky 2000, 2001) between a functional head and a DP. A clitic, in contrast is a component of the DP itself which moves from within the DP and attaches itself to a verbal host (in keeping with Uriagereka 1995, Torrego 1988, Arregi and Nevins 2008 among others). Whether a given verbal morpheme is a clitic or an agreement affix is crucial to determining its syntactic behaviour. I thereby devote this section to investigate the clitic/affixal status of –suu.

**TEST I.** The first test that I employ comes from Preminger’s (2009) study on verbal markers in Basque. Specifically, Preminger proposes that in the absence of an agreement relation being established between a functional head and a DP, default morphology obtains on the functional head. On the other hand, there is



no default option available if cliticization fails to come through. Given this test, let us examine the behaviour of –suu. As seen in example (5), the presence of –suu is banned if the subject is 1<sup>st</sup>/2<sup>nd</sup> person. This construction without -suu is ungrammatical with no available default version of the clitic to save the derivation

Conversely, consider the case of agreement in Punjabi. In a construction where all arguments are marked with adpositional case markers (*ne* and *nuu*), none of the arguments can trigger agreement on the verb. For lack of an agreement trigger, the verb ends up manifesting default agreement/3msg (9).

- (9) raam=ne      kuRii=nuu      vekhyaa  
      Ram=erg      girl=acc      see.perf.m.sg (def)  
      ‘Ram saw a girl.’

**TEST II.** The second diagnostic that I employ comes from Arregi and Nevins (2008) and Nevins (2011). Specifically, Nevins (2011) proposes that clitics are tense-invariant since they are D elements. Agreement affixes, in contrast, by virtue of being non-D elements, are predicted to change with the change in tense/aspect. Let us explore –suu in light of this diagnostic. Consider the following examples where the argument replaced by –suu is indicated by a ~~strickethrough~~.

- (10) raam=ne    ~~kuRii=nuu~~      vekhyaa=suu  
      Ram=erg    ~~girl=nuu~~      see.perf.m.sg =3sg  
      ‘Ram saw him/her.’
- (11) raam      ~~kuRii=nuu~~      roz      vekhdaa=suu  
      Ram.nom    ~~girl=acc~~      everyday    see.hab.m.sg=3sg  
      ‘Ram sees him/her every day.’
- (12) raam      ~~kuRii=nuu~~      vekh      reyaa=suu  
      Ram      ~~girl=nuu~~      see      prog.m.sg=3sg  
      ‘Ram is looking at him/her.’

(10) is a perfective structure marked by the presence of –yaa on the verb. In (11), we see a habitual structure, and (12) is a construction in progressive aspect. We notice that the form of –suu remains unchanged across the three aspects<sup>3</sup>. Compare the facts for –suu with the agreement affix on the verb. In the non-perfective examples in (11)-(12), where the nominative subject triggers agreement on the verb, we see that the form of the verb changes from *vekhdaa* to *vekh reyaa*. This test, like the previous one, hints at the pronominal (and not affixal) status of –suu.

**Test III.** Moving on, the third diagnostic that can help understand the nature of -suu relates to the semantic restrictions that it imposes on the co-referred argument. Cross-linguistically, it has been noted that while clitics impose semantic restrictions on the argument that they co-reference, agreement markers are not sensitive to the semantic properties of the agreed with noun (Süner 1988, Uriagereka 1995, Anagnostopoulou 2003 among others).

<sup>3</sup> Since -suu is strictly banned in the presence of an auxiliary, we cannot test the invariability of –suu across past and present tenses which are realised by an auxiliary in the language. However, the future marker in Punjabi is not an auxiliary verb, such that the marker –g is attached directly to the verb. –suu is found unchanged in the future tense, thereby affirming its tense-invariance.

- i. karan      vekhegaa=suu  
      Karan.nom    see.fut.m.sg=3sg  
      ‘Karan will see him/her.’

As for -suu in Punjabi, we see that in order to refer to an object, -suu requires it to be definite and familiar to both the speaker and the hearer. Thus, a non-familiar, or indefinite object cannot be co-referred by -suu, as shown in (13).

- (13) \*raam=ne kissii/ikk kuRii=nuu vekhyaasuu  
 Ram=erg some/one girl=nuu see.perf.m.sg=3sg  
 ‘Ram saw some girl/boy (intended).’

For agreement affixes, on the contrary, there is no semantic restriction on the argument that is able to trigger the presence of an agreement marker; it only needs to be unmarked; i.e. without an adposition (14).

- (14) raam=ne o waal-ii kitaab/koyii kitaab veccii  
 Ram=erg that waala-f.sg book/some book sell.perf.f.sg  
 ‘Ram sold that particular book/some book.’

Like the previous tests, this test also points at the clitic-hood of -suu.

**Test IV.** Based on her study of Amharic, Kramer (2010) suggests that an agreement marker, even if default, must obtain in a structure. A clitic, on the contrary, is only optional. Consider the case of Punjabi, where the agreement marker must obtain. If all the arguments in a structure are adposition marked, such that they cannot control agreement, the verb manifests default agreement. Thus, consider the example in (15), where the marker -iiyaaN (perf.f.pl) is obligatory and cannot be dropped.

- (15) karan=ne kitaabaã vecciyaã/\*vec  
 Karan=erg book.f.pl sell.perf.f.pl/\*sell  
 ‘Karan sold books.’

Contrary to the affix, -suu is optionally present to co-refer to a dropped argument, as seen so far.

**Test V:** This test for clitic-hood first discussed in Kayne (1969), and then in Sportiche (1996), Muller (1992) pertains to conjunction of clitics. Specifically, it is claimed that clitics cannot conjoin independently of their host. Employing this test on -suu, we observe that -suu cannot be conjoined independently of the host (16)<sup>4</sup>.

- (16) \*raam jaandaa=suu<sub>i</sub> te suu<sub>j</sub>  
 Ram know.hab.m.sg=3g and 3sg  
 ‘Ram knows her/him and her/him.’

To summarise the findings of this section, we have seen that -suu in Punjabi is a clitic and not an affix based on the following observations: (a) -suu does not have a default form, (b) -suu is tense-invariant, (c) -suu imposes semantic restrictions on the co-referenced argument, (d) -suu is optional and (e) conjoining -suu independently of the verbal host results in ungrammaticality.

<sup>4</sup> It must be noted that the auxiliary in the language also cannot join independently of the host (i). However, this seems to emerge from a semantic ban on conjunction of two differing tenses.

i. \*karan kuRii=nuu jaandaa e te sii  
 Karan girl=nuu know.hab.m.sg be.pres and be.past  
 ‘Karan knows and knew the girl.’

### 3 Licensing -suu

Given its clitic-hood, I posit a DP-structure in (17) for -suu, in keeping with Uriagereka (1995), Arregi and Nevins (2008), Kramer (2010) among others.

(17) [<sub>DP</sub> (doubled argument)]<sub>DP</sub> clitic<sub>[iperson,number,ucase]...</sub> ]]

As shown in (17), the clitic is a bundle of person, number and case features. Following the standard assumption, I propose that the clitic DP originates as a complement to the V head (Anagnostopoulou 2006, Mavrogiorgos 2010). This clitic initially merged in a theta position moves to the edge of v, where it is valued for case by the v head. It must be noted that the clitic is both a head and a phrasal category at the same time (in keeping with Chomsky 1995:402-403); as such, it can merge both as a head and as a phrasal projection. I suggest that the clitic moves to the specifier of vP as a phrasal projection and gets valued for case.

From the edge of vP, the clitic moves higher to FP (in the sense of Uriagereka 1995) for information structure reasons. Specifically, I claim that the clitic can be understood neither as the topic nor as the focus of the sentence. Instead, with Butt (2007) I suggest that it is best understood as backgrounded information. To this end, I provide some evidence to show that the clitic does not correspond to a focussed or a topicalised element. I start with ‘focus’ first. One of the classical pragmatic uses of focus is to highlight the part of an answer that corresponds to the wh-part of a constituent question (Paul 1880, Hamblin 1973, Krifka 2006). Employing this test on -suu, we see that it cannot refer to a DP that is the answer of a wh-question word (18).

(18) karan=ne      ki=nuu      vekhyaa  
       Karan=erg    who=nuu    see.perf.m.sg  
       ‘Who did Karan see?’  
 Answer: #Karan=ne vekhyaa=suu  
       ‘Karan saw him/her (intended).’

Further, DPs marked with an overt focus particle such as ‘only’ and ‘also’ cannot be replaced by -suu, as in (19).

(19) karan=ne      ~~kuRii=nuu=ii/vii~~      vekhyaa=suu  
       Karan=erg      ~~girl=nuu=only/also~~      see.perf.m.sg=3.sg  
       #‘Karan saw him/her only/also.’

Moving on, -suu also cannot be understood as the topic of a clause. Punjabi uses marking an argument with *te* ‘as for’ as a topicalisation strategy. We note that such a topicalised argument cannot be cliticised using -suu, as is demonstrated in (20).

(20) karan=ne      ~~kuRii=nuu=te~~      vyaa      vicc      nayii      bulaayaa=suu  
       Karan=erg      ~~girl=nuu=top~~      wedding      in      neg      call.perf.m.sg=3sg  
       #‘As for him/her, Karan did not call him/her to the wedding.’  
       ‘Karan did not call him/her (familiar) to the wedding.’

Given these observations, I contend with Butt (2007) that -suu is neither focus nor topic; instead, it represents back-grounded material. Since it is back-grounded material, it fails to be the topic (what the sentence is about). Moreover, its back-grounding function also prevents it from being the focus. I posit that the clitic is licensed as the bearer of back-grounded material by moving to FP (à la Uriagereka, 1995) located above the TP. Concretely, I suggest that from the edge of vP, the clitic moves like a head and

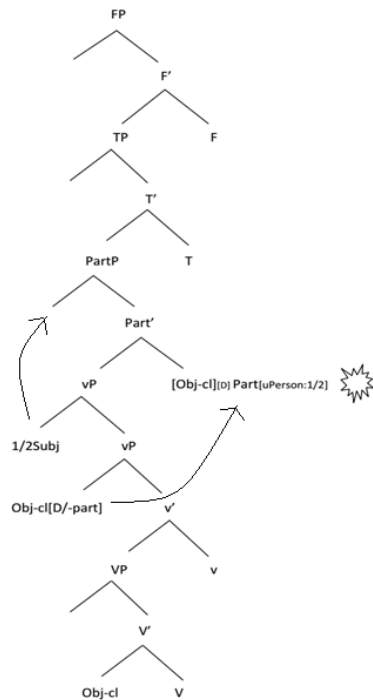
adjoins to the T head, where it forms a cl-T complex. This entire complex then raises to FP and left adjoins to the F head (à la Kayne 1994, Ouhalla 2005), as schematised in (21).

(21) [FP [TP [vP [VP Obj-cl<sub>i</sub> V] v] Cl-T] [Cl-T-F]

#### 4 Explaining blocking effects

Given the account for licensing of –suu, I now return to our initial question regarding the ban on object –suu with 1<sup>st</sup>/2<sup>nd</sup> person subjects. The object clitic originates as a complement of VP and the 1<sup>st</sup>/2<sup>nd</sup> subject is base generated in the specifier of vP. Located in the specifier of vP, the subject cannot be valued for case since it has a person feature that needs licensing. Thus, it raises to the edge of PartP in order to get its person feature valued. The object clitic moves to the inner specifier of vP (in the sense of Richards 1997), where it gets case. From the edge of vP, it also needs to raise to FP for semantic-pragmatic reasons. Thus the object clitic raises and adjoins to the Part head on its way up in the structure. The presence of 1<sup>st</sup>/2<sup>nd</sup> person features on the Part head do not match with the 3<sup>rd</sup> person feature on –suu, which is not specified for 1<sup>st</sup>/2<sup>nd</sup>], leading to a derivational crash, as illustrated in figure I.

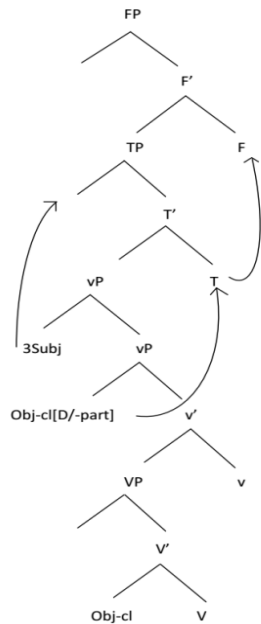
Figure I. Ban on –suu with 1<sup>st</sup>/2<sup>nd</sup> subject



A crucial theoretical assumption that my proposal relies upon pertains to the delayed deletion of uninterpretable person features on the Part head. Specifically, in contrast to the assumption (à la Chomsky 2001) which requires uninterpretable features to get deleted as soon as they are agreed with, Pesetsky & Torrego (2001) (also see Carstens, 2003) propose that the lifespan of an uninterpretable feature can be extended in syntax. Thus, an uninterpretable feature can remain syntactically active at least till the completion of the phase it is located in. I assume P&T's account to suggest that the uninterpretable person features on the Part head remain active till the completion of the CP phase. Therefore, when the object clitic moves to FP via the Part head, it encounters the active and mismatching person features.

The 3<sup>rd</sup> person subject does not have any person features that need valuation. Consequently, there is no person projection (PartP) in a structure with a 3<sup>rd</sup> person subject. This subject stays insitu and gets ergative marked in its base generated position, i.e. the specifier of vP. It can move to spec, TP for EPP reasons. As for the object clitic, it gets its case in the inner specifier of vP; the absence of PartP in the structure permits the object clitic to raise from the edge of vP to FP via the T head without any interference. Hence, no ban is observed on –suu with 3<sup>rd</sup> person subjects. This is shown in figure II.

Figure II. Presence of –suu with 3<sup>rd</sup> subject



## 5 Conclusion

In this paper, I have presented and explained novel facts from Punjabi showing the ban on -suu with 1<sup>st</sup>/2<sup>nd</sup> person subjects. These facts add to the existing literature on blocking effects as observed with reflexives such as *taan* in Malayalam and *ziji* in Chinese (see Jayaseelan 1998 for Malayalam, Huang and Tang 1991 for Chinese). Additionally, the analysis of these blocking effects as following from the person licensing requirement of the 1<sup>st</sup>/2<sup>nd</sup> subjects corroborates the 1<sup>st</sup>/2<sup>nd</sup> versus 3<sup>rd</sup> person divide in syntax.

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# Nepali *Le* as a Marker of Categorical Subjecthood

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## ABSTRACT

The purpose of this paper is to investigate an account of ergative-nominative alternations in non-perfective clauses in Nepali. As observed in many Indo-Aryan languages, the ergative case marker is obligatory in perfective tenses. The variable presence of ergative marking in the non-perfective domain of Nepali has been articulated as an expression of emphasis, subject animacy, or individual-level predication. I argue that that *=le* marks the subject of a **categorical proposition** in the sense of Kuroda (1972). I explore the felicity of *=le* in particular discourse contexts depending upon whether the response is presented thematically or categorically. I also note that *=le* may only be found in quantifier phrases with strong construal, which provides support for the notion that *=le* marks categorical subjects.

## 1 Introduction

Many modern Indo-Aryan languages have a split in ergative case-marking conditioned by aspect. In general, the verb agrees with the nominative subject of a transitive clause outside of the perfective domain, and in the perfective domain there is ergative case-marking and the verb agrees with the unmarked object. Masica describes the “classic NIA split” as “quasi-ergative case-marking and agreement in the Perfective only, vs nominative-accusative patterns in non-Perfective tenses” (Masica 1993, 342). We can see this pattern as it occurs in Hindi (Deo and Sharma 2006, 376):

- (1) a. *ram=ne        cidiya                dekh-i*  
Ram.M=Erg sparrow.F.Sg.Nom see-Perf.F.Sg  
'Ram saw a sparrow.'
- b. *sita                ram=ko        dekh-t-i h-ai*  
Sita.F.Nom Ram.M=Acc see-Impf-F.Sg be-Pres.3.Sg  
'Sita sees Ram.'

In (1a), the verb is marked in the perfective and agrees with the object. There is ergative case-marking (*-ne*) on the subject of the sentence, *Ram*. For perfective tenses such as in (1a), the verb agrees with the object if there is no accusative case marking, and agreement is default otherwise. In (1b), the verb is marked in a non-perfective tense and agrees with the subject. The object is marked with the accusative case marker *-ko*. This is because human-denoting specific objects in Hindi obligatorily take accusative marking. Thus we have an ergative pattern for perfective tenses and a nominative-accusative pattern in non-perfective tenses.

There is a substantial amount of variation in this pattern among the Indo-Aryan languages (cf. Deo and Sharma 2006). Some languages like Bangla have completely lost all ergative case marking. Other languages, like Assamese, have extended the ergative case marking to all transitive clauses in the language (Masica 1993, 344). Nepali presents with a particularly unique pattern. Ergative marking is obligatory in the perfective domain, and it varies with the nominative elsewhere in the language. In the non-perfective domain, the same sentence may be expressed with or without ergative case marking. Verbal agreement is always with the subject whether or not the subject carries the

ergative case marker *=le*:<sup>1</sup>

- (2) a. **ram=le**      cidi                      **dekh-yo**  
Ram.M=Erg sparrow.Nom see-Perf.3.Sg  
'Ram saw a sparrow.'
- b. **sita**              / **sita=le**      ram=lai      **dekh-chin**  
Sita.F.Nom / Sita.F=Erg Ram=ACC see-Impf.F.3.Sg  
'Sita sees Ram.'

As in Hindi, the case marker (*=le*) is obligatory in the perfective. Unlike Hindi, the verb agrees uniformly with the subject. In both (2a) and (2b), the perfective verb agrees with the subject, even if there is an ergative case marker on the subject. This is true whether or not the object has accusative case-marking. The most interesting case is (2b), in which we find optionality. Here we see that the subject may take an ergative marker or may be unmarked. This optionality is apparently present for all verbs in non-perfective tenses:

- (3) a. **sunita** / **sunita=le**      khana **pak-aun-dai-cha**  
Sunita.F / Sunita.F=Erg food    cook-Caus-Prog-Impf.M.3.Sg  
'Sunita is cooking food.'
- b. **ram** / **ram=le** harek din euṭa      āp      **khan-cha**  
Ram.M / Ram.M=Erg every day single mango eat-Impf.M.3.Sg  
'Ram eats a mango every day.'
- c. **ma** / **mai=le**      **pucc-āula**  
I      / I.Obl=Erg clean-Ind.Fut.1.Sg  
'I will clean it.'
- d. **cor** / **cor=le**      scarf **cor-thyo**  
thief / thief=Erg scarf steal-Hab.M.3.Sg  
'Thieves would steal the scarf.'

No other language among the contemporary Indo-Aryan languages exhibits such a pattern of ergative marking in the non-perfective domain. This pattern in Nepali has been observed at least since Grierson (1904), who takes ergative marking as an expression of emphasis. It has been similarly characterized as an expression of emphasis by Masica (1993) and Clark (1963). Abadie (1974) argues that *=le* disambiguates the subject argument when it would otherwise be ambiguous. Finally, Butt and Poudel (2007) notes the correspondence between the appearance of *=le* and individual-level predication.

In this paper, I review the various proposals that have been made regarding *=le* as it appears in the imperfective domain. I will discuss my own proposal, which is that *=le* optionally marks the subject of a categorical proposition as formulated by Kuroda (1972). Thus, whenever *=le* appears on the subject of an imperfective transitive clause, that clause is a categorical proposition. Next, I will discuss the predictions that this theory makes for the use of *=le* in particular discourse contexts. I will also examine evidence from the appearance of *=le* on quantificational determiners.

## 2 Previous research on *=le*

This unusual extension of *=le* into the non-perfective domain in Nepali has been noted since at least Grierson (1904), who describes this usage of *=le* as “idiomatic” and “emphatic”, and attributes its usage to influence from Tibeto-Burman languages. The term “emphasis” is invoked in Clark (1963) and Masica (1993), although it is never explicitly defined. Bickel (2011) takes this as evidence that *=le* marks focus, but Abadie (1974) and Verbeke (2011) both disagree with the notion that the

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<sup>1</sup>Tense and aspect markers are glossed as PRES: Simple Present (Imperfective), PERF: Perfective (Simple Past), HAB: Past Habitual, PROG: Progressive, FUT: (Nondefinite) Future, DEF.FUT: Definite Future, CAUSE: Causative, PASS: Passive. Case markers are ERG: Ergative, ACC: Accusative, OBL: Oblique, INSTR: Instrumental, ABL: Ablative, GEN: Genitive, LOC: Locative.



element marked by *=le* must be focused. The term “emphasis” captures the intuition that the argument marked by *=le* is given special attention in the discourse, but this is still a rather vague notion. Abadie (1974) suggests that *=le* may be used to avoid ambiguity when there would otherwise be a meaning difference, as in the following (Abadie 1974, 15):

- (4) a. *yo gai=le khan-cha*  
 this cow=Erg eat-Pres.M.3.Sg  
 ‘This cow eats.’  
 b. *yo gai khan-cha*  
 this cow eat-Pres.M.3.Sg  
 ‘This cow eats / This (one, person) eats cow.’

When *=le* is present as in the first example of (4a), “cow” must be the subject. In the second example of (4b), there are two possible interpretations: “This cow eats,” and “This (one, person) eats cow.” The determiner *yo* may be marking an elided subject. While it is true that (4b) is ambiguous in a way that (4a) is not, it is easy to find situations in which *=le* may be preferred even though it cannot serve to disambiguate the subject argument:

- (5) *gai=le yo khan-cha*  
 cow=Erg this eat-Pres.M.3.Sg  
 ‘A cow eats this.’

The above example is a minimal adjustment to Abadie’s example. In (5), *=le* cannot be serving to disambiguate the subject argument, because the position of the determiner after ‘cow’ indicates that it must be marking an object (in canonical SOV order). And yet here speakers still use *=le*, and may even find it odd for it to be absent. While *=le* does have the effect of disambiguating the subject of a sentence when it would otherwise be ambiguous, more needs to be said about the function of *=le* in the many situations in which *=le* does not disambiguate the arguments.

A promising proposal comes from Butt and Poudel (2007), who suggest that *=le* marks individual-level predication. This distinction is illustrated with the following examples (Butt and Poudel 2007, 7):

- (6) a. *calak=le gaḍi calaun-cha*  
 driver.M=Erg car drive-Pres.M.3.Sg  
 ‘The driver drives the vehicle.’  
 b. *guru gaḍi calaun-cha*  
 teacher.M.Nom car drive-Pres.M.3.Sg  
 ‘The teacher is driving/will drive the vehicle.’

The context in the first example of (6) is that a school’s bus driver drives the children everyday: that is his occupation. In the second, the teacher just happens to be driving the bus today because the bus driver is out. Note that the simple present tense of the verb *calāuncha* ‘to drive’ has three possible interpretations: it may have a habitual reading, an immediate present reading, or a future-oriented reading. In this sentence, *=le* marks the reading with individual-level predication, that is, the habitual reading.

When presented with sentences like those above, many speakers tend to agree with the idea that *=le* marks the difference between a person who drives taxis as an occupation, and a person who simply may be doing these things at the moment. However, as we will see below, *=le* may also be found in clauses for which the predicate is neither habitual nor individual-level. We have already seen an example of *=le* when the sentence is in the present progressive(3b). Verbeke provides more examples in which individual-level predication does not seem to be present (Verbeke 2011, 165):

- (7) *raja=le sodh-e han yas=le pheri ke bhan-dai-che*  
 king=Erg ask-Perf.M.3.Sg Q she=Erg again what say-Prog-Pres.F.3.Sg  
 ‘The king asked: “What is she saying?”’

- (8) aphu=le na-bok-era kas=le bok-i-din-cha  
 self=Erg Neg-carry-Conj who=Erg carry-Lnk-give-Pres.M.3.Sg  
 ‘If I don’t carry it myself, who will carry it?’

In summary, the marking of =le on the subject of transitive perfective clauses has been described as giving the subject greater emphasis, as disambiguating the subject argument, or as distinguishing individual from stage-level predication. All of these notions express intuitions about the way in which a sentence with a marked subject has a different meaning. In the next section, I will argue that a distinction betweenthetic and categorical propositions can tie many of these notions together to represent the contribution of =le in the clause.

### 3 Proposal

Kuroda (1972), in analyzing topic marking in Japanese, proposes a distinction between two classes of propositions -thetic and categorical. This distinction comes from the theories of judgment propounded by the 19th century philosophers Brentano and Marty (Kuroda 1972, 1990, Ladusaw 2000, McNally 1998). A **thetic proposition** is a description of an entity or an eventuality in which no element of the sentence is given particular discourse prominence. Ladusaw (2000) describes athetic judgment as an existential commitment to a description. A **categorical proposition** relates the occurrence of the described event to a particular entity. It is a “double judgment”: an entity is first presented, and then a property is predicated of this entity. Ladusaw notes that the subject of a categorical judgment must be presupposed in the discourse, and must be strongly construed.

The argument advanced here is that =le marks the subject of a categorical proposition in Nepali. If we take =le to be a marker of categorical subjecthood, this provides us with an explanation for intuitions about minimal pairs such as (9) below:

- (9) a. ma curoṭ khan-chu  
 I cigarette eat-Pres.M.3.Sg  
 ‘I smoke cigarettes.’ (I have a habit)  
 b. mai=le curoṭ khan-chu  
 I=Erg cigarette eat-Pres.M.3.Sg  
 ‘I smoke cigarettes.’ (I am a smoker)

The first statement may be a simple statement of habit, but in the second statement =le emphasizes that the person is a *curoṭ khane mance* ‘a cigarette-smoking person.’ This is what it means to make a categorical proposition: we first bring attention to an entity, and then we predicate a property of that entity. Similarly, the unmarked form in (10a) below does not emphasize, as (10b) does, that the speaker is building his own house:

- (10) a. ma aphno ghar banau-dai-chu  
 I own house build-Prog-Pres.M.1.Sg  
 ‘I am building (my) own house.’  
 b. mai=le aphno ghar banau-dai-chu  
 I.Obl=Erg own house build-Prog-Pres.M.1.Sg  
 ‘As for me, I am building (my) own house.’

Here both predicates have a stage-level interpretation, but -le has the effect of directing attention first to the speaker and then to the activity. My consultant Timila Dhakwa expressed it the following way:

*“It seems that when it is a general statement you can leave out the =le and it still makes sense. But having the =le just makes it clear as to who is doing the action. You are making the extra statement that it is [the subject] doing the action.”*

By “marker of a categorical subject,” I mean that =le marks the sentence argument that is logically the subject of a categorical proposition. This distinction corresponds somewhat to topic, particularly

in that the categorical subject is distinct from the syntactic or grammatical subject of the sentence. Kuroda advances the *thetic/categorical* distinction to explain the Japanese marker *wa*, which is frequently characterized as a prototypical topic marker. The Japanese marker *wa* may mark the object or even certain non-NPs that can be construed as the sentence topic.

The situation in Nepali is different because *=le*, as the ergative marker, may only mark the grammatical subject of the sentence. However, the entity marked by *=le*, when it is present in non-perfective clauses, clearly has a particular discourse prominence. Portner and Yabushita (1998) discuss Japanese as it relates to a topics-as-entities formalization of topicality in which topics denote entities that the sentence is “about.” The topic information is part of the common ground. The sentence element identified as a topic must be definite and its existence must be presupposed in the mind of its speakers. I believe that this is what is intended by “emphasis” - the element marked by *=le* refers to an entity that is what the sentence is about.

This analysis shares with Butt and Poudel (2007) the intuition that *=le* brings attention to a particular argument in order to express a property of that object.<sup>2</sup> It is compatible with a view like Abadie’s in which a statement may be expressed with *=le* in order to clearly delineate arguments, but it is more generally an expression of information structure. In many discourse contexts a speaker may felicitously express the same statement either *thetically* or *categorically*, and this is the source of the optionality of *=le*.

#### 4 Discourse Context

The felicitous utterance of a *thetic* or *categorical* proposition is related to discourse structure. As Caro notes for Spanish, “often the same proposition may be expressed *thetically* or *categorically* by the speaker, by choosing to initiate his/her message with a topic and then proceed with the focus information or by presenting the state of affairs as a compact event involving no obvious parts” (Caro 2009, 18). If a sentence marked with *-le* must be a *categorical* proposition, then such a sentence:

1. may contain an individual-level or stage-level predicate, but
2. cannot be a *thetic* proposition.

Furthermore, the NP marked by *-le*:

1. must refer to a presupposed entity, i.e.,
2. must have a strong construal.

If *=le* marks the subject of a *categorical* judgment, then it cannot appear in a *thetic* clause. So a clause in which *=le* appears is a *categorical* proposition. If the subject is unmarked, then it is a *thetic* proposition which may not be a felicitous response to a question about a particular entity. The example below illustrates this interaction. In this situation, a man hears a loud noise outside and notices his friend looking out the window:

- (11) Q: *bahira ke hun-dai-cha?*  
 outside what happen-Prog-Pres.M.3.Sg  
 ‘What is happening outside?’
- A: *shikari / shikari=le mriga samat-dai-cha*  
 hunter / hunter=Erg deer catch-Prog-Pres.M.3.Sg  
 ‘A/The hunter is hunting a deer.’

In (11), the question is a request for information about a general state of affairs. A felicitous response may contain a description (a *thetic* proposition) or relevant information about a particular argument (a *categorical* proposition). If the existence of a hunter is not presupposed in the discourse, then the subject *shikāri* will not be marked with *=le*. This corresponds to the English “A/some hunter is

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<sup>2</sup>Butt and Poudel briefly equate stage-level predicates with *thetic* propositions and individual-level predicates with *categorical* propositions, but I believe these notions are logically separate. Thus *=le* may be found with either individual-level or stage-level predicates.

hunting deer.” If the existence of the hunter *is* presupposed (for example, if there is one particular hunter who is always lurking around the property such that the hunter’s existence is known to both speakers), then *=le* may be present or absent, depending upon whether the speaker wishes to express the observation thetically or categorically. The corresponding English sentence for both situations would be “The hunter is hunting a deer.”

If, conversely, the question is the one expressed by (12), then only a categorical proposition will do as a response. A request for information about a particular entity probably cannot be answered with a thetic proposition. Here we are looking for information about a particular hunter. Thus, *=le* must be present, and the corresponding English sentence would again be “The hunter is hunting a deer.”

(12) Q: shikari=*le* ke gar-dai-cha?  
 hunter=*Erg* what do-*Prog-Pres.M.3.Sg*  
 ‘What is the hunter doing?’

A: #shikari / shikari=*le* mriga samat-dai-cha  
 #hunter / hunter=*Erg* deer catch-*Prog-Pres.M.3.Sg*  
 ‘The hunter is hunting a deer.’

In many contexts, a Nepali speaker may have the choice of expressing the same statement either thetically or categorically. It is because of this that the use of *=le* appears to be optional in many contexts. But if the question concerns a particular entity like the hunter, then *=le* is obligatory.

## 5 Construal of Quantifiers

Following the notion that the element marked by *=le* must have a strong construal, we can examine the distribution of *=le* for particular quantifiers which can be construed as either weak or strong. Following the discussion of ambiguous quantifiers like ‘some’ and ‘many’ in Partee 1983, we can similarly construe Nepali quantifiers like *dherai* ‘many’ and *kohi* ‘some’ as ambiguous between a strong construal, which presupposes the existence of a set, and an indefinite weak construal. Other quantifiers, like *dheraijaso* ‘most’, seem to be unambiguous. *Dheraijaso* has only a strong reading. The usage of particular quantifiers thus interacts with the placement of *=le*, because the subject of a thetic proposition cannot have strong construal:

(13) dherai biddiyartha din-ko dui-tin ghanṭa sik-chan  
 many student day-*Gen* two-three hour learn-*Pres.M.3.Pl*  
 ‘Many students / Many of the students study 2-3 hours a day.’

There is both a weak and a strong interpretation available for unmarked *dherai* as in (13) above. A strong construal may be appropriate in a discourse about a particular group of students and their study habits, while a weak reading may be a more general statement about students. However, when *=le* marks the quantifier the weak reading is no longer available:

(14) dherai=*le* biddiyartha din-ko dui-tin ghanṭa sik-chan  
 many=*erg* student day-*Gen* two-three hour learn-*Pres.M.3.Pl*  
 ‘Many of the students study 2-3 hours a day.’

The quantifier *kohi* ‘some’, a similarly ambiguous quantifier, shows a similar distinction between marked and unmarked forms, in which the strong reading is the only one available with *kohi-le*:

- (15) a. kohi.kohi biddiyartha din-ko dui-tin ghanṭa sik-chan  
 some.Red student day-*Gen* two-three hour learn-*Pres.M.3.Pl*  
 ‘Some students / Some of the students study 2-3 hours a day.’  
 b. kohi.kohi=*le* biddiyartha din-ko dui-tin ghanṭa sik-chan  
 some.Red=*Erg* student day-*Gen* two-three hour learn-*Pres.M.3.Pl*  
 ‘Some of the students study 2-3 hours a day.’

An unambiguously strong quantifier like *dheraijaso* ‘most’, whether marked or unmarked by *=le*, has only one reading:

- (16) *dheraijaso* / *dheraijaso=le* *biddiyarhi din-ko* *dui-tin ghanṭa sik-chan*  
 most / most=Erg student day-Gen two-three hour learn-Pres.M.3.Pl  
 ‘Most of the students study 2-3 hours a day.’

This is summarized in Figure 1.

	Weak	Strong
<i>dherai</i> N	Yes	Yes
<i>dherai</i> N- <i>le</i>	<b>No</b>	Yes
<i>kohi</i> N	Yes	Yes
<i>kohi</i> N- <i>le</i>	<b>No</b>	Yes
<i>dheraijaso</i> N	<b>No</b>	Yes
<i>dheraijaso</i> N- <i>le</i>	<b>No</b>	Yes

FIGURE 1 Marked and bare forms of quantifier phrases

We can also look at quantifier phrases with elided subjects. If it can be inferred from the context, the subject in a quantifier phrase may be deleted. In this case, *=le* may directly mark the quantifier directly. If the subject is elided, it must be strongly construed, so there will only be one interpretation of the quantifier phrase. Ambiguous quantifiers may be marked or unmarked, depending upon whether the sentence is interpreted thetically or categorically:

- (17) a. *kohi.kohi* / *kohi.kohi=le* *biddiyarhi din-ko* *dui-tin ghanṭa sik-chan*  
 some.Red /some.Red=Erg student day-Gen two-three hour learn-Pres.M.3.Pl  
 ‘Some of the students study 2-3 hours a day.’  
 b. *dherai* / *dherai=le* *biddiyarhi din-ko* *dui-tin ghanṭa sik-chan*  
 many.Red many.Red=Erg student day-Gen two-three hour learn-Pres.M.3.Pl  
 ‘Many of the students study 2-3 hours a day.’

The unambiguously strong quantifier *dheraijaso*, as in (18), seems to be generally dispreferred with elided subjects. While this does not follow directly from the analysis presented here, it certainly bears further investigation. It is one of the few contexts in which the absence of *=le* seems to be dispreferred under any reading:

- (18) *dheraijaso* / *dheraijaso=le* *biddiyarhi din-ko* *dui-tin ghanṭa sik-chan*  
 most / most=Erg student day-Gen two-three hour learn-Pres.M.3.Pl  
 ‘Most of the students study 2-3 hours a day.’

## 6 Conclusions

I hope to have shown that describing *=le* as a marker of categorical subjecthood unifies many of the varied proposals and intuitions about the contribution of *=le* to the clause. In particular, Butt and Poudel’s notion that *=le* marks individual-level predication captures the same basic intuition that *=le* brings attention to a particular argument in order to express an inherent property of that object, but this account allows for the presence of *=le* with stage-level predicates.

This makes the prediction that we should not find *=le* in a thetic clause, and that the referent should be presupposed. We can see how this interacts with discourse, in which a speaker often has the opportunity to choose between a thetic or a categorical response. This also aligns nicely with quantifiers in Nepali, in which (strong) proportional readings must be correlated with *=le* marking.

Moving forward, I believe that we should explore cases like those expressed in the previous section to see how commonly *=le* may be found on indefinite referents, because this represents a puzzle. It

would also be useful to explore the relationship between *=le* and the prosodic structure of the clause, because this can give us insight into focus and topic as it is expressed more generally in Nepali.

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- (3) a. am-ra      **lamba lamba** gach ã:k-te cay-i      Bangla-IA  
 1p-pl.Nom long long tree draw-prt want-1p  
 'We want to draw long long trees.'  
 Each/most tree/s we want to draw is/are long
- b. əy      layrik **əčəw əčəw=bə** pa-y      Meiteilon-TB  
 1p.Nom book big big=Nzr read-Ind  
 'I read big big books'  
 Each one of the books I read was big.
- c. nyan      **vəliyə vəliyə** syntax pustakaŋgaļ vayikkumayirunnu      Malayalam-DR  
 1p-Nom big big syntax book-pl read-hab-past  
 'I used to read big big syntax books.'  
 Each/most of the syntax books I used to read was/were big.

Similar to the example of numeral reduplication discussed in Balusu (2006) and Balusu and Jayaseelan (2013), the events containing the reduplicated adnominal object modifiers in (3) are associated with both distributivity as well as plurality. Since Bangla and Meiteilon do not have morphological plural marking on the noun, without reduplication, sentences (3a) and (3b) would be interpreted as singular. Unlike them, Malayalam, marks plurality morphologically on the noun. However, similar to the reduplicated Telugu numeral adnominal modifiers of Balusu (2006), this plurality is also obligatory in reduplicated structures like (3c) in Malayalam.

Further, unlike the morphological reduplicants, the lexical reduplication strategies fluidly carry over into Indian English sentences like (4) as well. However, the range of meanings associated with them differs depending upon the first language of the speaker<sup>5</sup>.

- (4) Syntax papers have **big big** trees.      Indian English

In fact not all Indians can process all cases of reduplication in Indian English. Such data will be interspersed in the paper along with sentences from Hindi, Bangla, Meiteilon, Malayalam and Telugu. The paper consists of two initial sections that discuss how the dissimilar morpho-syntactic contexts of event modifier and adnominal reflexive show very similar constraints on copying the inflectional markers along with the base, followed by an analysis of these contexts, which forms the final section.

## 2 Reduplication of verb roots

Verbs roots in SALs are often bound morphemes combining with inflections including non-finite conjunctive particles to create adverbial event modifiers. When such complexes are reduplicated the inflection is either obligatorily reduplicated or obligatorily not reduplicated along with the base.

<sup>5</sup> In some SALs like Bangla, reduplication also has a scalar function such that the meaning ranges between 'most of the X' and 'each of the X'. The range of meaning for "Syntax papers have big big trees.", in Bangla-English differs slightly from Meiteilon-English.

	at least one (very) big tree	more than one (very) big trees.
Each Syntax paper has	True-BE, False-ME	True-BE, True-ME
Most syntax papers have	True-BE, False-ME	True-BE, False-ME



## 2.1 Event co-occurrence

When two events  $\alpha$  and  $\beta$  are such that  $\beta$  begins/happens while  $\alpha$  is still happening, then some SALs mark the fact that the initial point of  $\beta$  is temporally located within the span of  $\alpha$  by reduplicating the verb root of  $\alpha$ .

- (5) a. ma **čət=nə čət=nə** nok-khi Meiteilon-TB  
 3p go=Adv go=Adv smile-Past  
 'S/he smiled while (s/he was) walking.'
- b. o **hāt=te hāt=te** hāš-chi-lo Bangla-IA  
 3p walk=prt walk=prt smile-Prog-Past (Also Hindi 1a)  
 'S/he was smiling while (s/he was) walking.'
- c. She was **walking walking** smiling. Indian English

The Dravidian language Malayalam, cannot reduplicate verbs in similar situations and instead use an associative marker that literally depicts event co-occurrence (6)<sup>6</sup>.

- (6) awan naḍannu=**konḍu** ciriccu Malayalam-DR  
 3p walk-past=Asso laugh-past  
 He walked while laughing.

Unlike Bangla, Hindi and Meiteilon, where the reduplicated verb also indicates the event that continued as the second one took place, in Malayalam, the sentence does not give information about the temporal distribution of the events with respect to one another. The reduplicated verb root in (5) that marks the temporal distributivity obligatorily carries along with it the inflectional particle.

## 2.2 Process duration in event structure

When two lexical verbs  $\alpha$  and  $\beta$  are such that  $\alpha$  denotes the process or path through which the result,  $\beta$ , obtains, then some SALs mark the unbounded nature of the process, in a temporally bound event by the reduplication of  $\alpha$ .

- (7) a. ma **čət čət=lə=gə** lak-i Meiteilon-TB  
 3p walk walk=perf=conj come-Ind  
 'S/he came walking./ 'S/he walked and came.'
- b. woh **cal cal=ke** aya Hindi-IA  
 3p walk walk=prt come-past (Also 1b)  
 'He came walking./ 'He walked and came.'
- c. o **hēt=e hēt=e** e-lo Bangla-IA  
 3p walk=perf walk=perf come-Past  
 'S/he came walking./ 'S/he walked and came'
- d. She came **by walk/ she came walking walking** Indian English

<sup>6</sup> Consequently the Indian English sentence, kosher in many discourse contexts in India, '*walking walking she was singing*' is very difficult to process for a Malayalam speaker.

Unlike (5), both in case of the TB language Meiteilon as well as IA language Hindi, the inflection on the verb cannot be reduplicated in (8a) and (8b). The Bangla case in (7c) where the inflection is not syntactically but morpho-phonologically motivated.

In order to keep the lexical paradigm uniform languages show a strong dis-preference to alter the phonological form of the lexical roots. Nevertheless, there are some cases where it is unavoidable. On account of the perfective morpheme being homophonous with the third person agreement morpheme, Bangla has the obligatory root allomorphy in verbs. So, the Bangla verb root *hãt-*, 'walk', becomes *hẽt-e* on addition of the perfective marker [-e]. Thus, for reduplication this complex is being treated similar to a suppletive morpheme rather than a combination of root and inflection.

### 3 Reduplication in Anaphors

Unlike IA languages that have lexical reflexives (8a and 8b), DR and TB languages build the reflexive by copying the pronominal (8c and 8d). Abbi (1990) as well as Subbarao (2012) noted this similarity between TB and DR, with the former referring to them as discontinuous Lexical reduplication (DLR), since the reduplicated morphemes have intervening phonological material.

- (8) a. radha **nije=ke** bhalobaš-e Bangla-IA  
 radha self=Acc love-3p  
 'Radha loves herself.'
- b. radha **ap-ne-aap=se** pyaar kar-ti hei Hindi-IA  
 radha self-Gen-self=towards love do-F be  
 'Radha loves herself.'
- c. mə **mə-sa=nə** **mə-sa=bu** nuŋsi-ǰə-y Meiteilon-TB  
 3p 3p-self=Subj 3p-self=Obj love-VR-Ind  
 S/he loves her/him self.'
- d. radha **tana=ni tanu** pogudu-kon-di Telugu-DR  
 radha self=Acc self=Nom praise-VR-agr  
 'Radha praised herself' (51:Subbarao 2012)

However, we find that the DLR structure of reflexives is mostly restricted to the object of transitive verbs like 'love' and 'praise'. As adnominal possessor reflexives they lose this complexity of reduplicated structure. Further, when such reflexives are put in the scope of a distributive operator, we observe that with the genitive inflection gets reduplicated along with the base in case of lexical anaphors, while it fails to reduplicate in case of DLR anaphors.

#### 3.1 Reduplication of lexical reflexives

Lexical anaphors are the cases where the language has special reflexives. Haspelmath (2005) observes that any language using a special reflexive with the adnominal possessor also uses it for the reflexive pronoun in the object, but the vice versa is not true. This means it is possible for a language to have a special reflexive lexical item, but use the regular pronoun in the adnominal possessor. For example, English.

- (9) English reflexive  
 a. She<sub>1</sub> killed herself<sub>1</sub>. (She<sub>1</sub> killed her<sub>2</sub>)

b. She<sub>1</sub> killed her<sub>1/2</sub> lover. (\*She killed herself's lover.)

(11: Haspelmath 2005)

Indo-Aryan languages Bangla and Hindi have special reflexive pronouns in the object position. When they are reduplicated under the scope of a distributive operator in the adnominal possessor position the possessive inflection is also reduplicated along with the reflexive morpheme.

(10) a. bacce **ap=ne ap=ne** ghar ga-ye Hindi-IA  
 child-Pl self=Gen self=Gen house go-past  
 'The children went to their respective homes'

b. bacca-ra **nij=er nij=er** baḍi(-te) gē-lo Bangla-IA  
 child-Pl self=Gen self=Gen house-(Loc) go-past  
 'The children went to their respective homes'

Note that the phonological form of the special reflexive in Bangla, *nij-* is identical in the object and adnominal possessor object position, but in case of Hindi, it is *ap-ne-aap-* in the former, and just *ap-* in the latter case.

### 3.2 Reduplication of non-lexical reflexives

The DLR anaphor in object position is composed of copies of subject and object marked respectively. In consonance with the cross-linguistic observation of Haspelmath (2005), we found the adnominal possessor reflexives in these languages to be morphologically less complex than the respective object reflexive morphemes as well.

(11) a. aṅaṅ-siṅ-du **mə-khoy=gi** mə-yum-da cət-khi Meiteilon-TB  
 child-Pl-Dem 3P-Cl-Gen 3P-house-Loc go-past  
 The children<sub>i</sub> went to their<sub>i/j</sub> home.

b. kuTTikaL **awar=uTe** wiiTT-il-eek'k'A pooyi Malayalam-DR  
 children they-Gen house-Loc-Dat went  
 The children<sub>i</sub> went to their<sub>i/j</sub> home.

c. bacca-ra **ta=der** baḍi(-te) gē-lo Bangla-IA  
 child-Pl dis Pr=Gen house-(Loc) go-past  
 'The children<sub>i</sub> went to their<sub>i/j</sub> home.'

In (11a) and (11b) the reflexives of Meiteilon and Malayalam no longer show the DLR structure described in Abbi (1990). These structures are similar to the English pronoun and get their reflexive meaning by co-indexation with the subject. Bangla, in spite of having a special reflexive morpheme, (8a) and (10b), can also use the discourse pronominal *ta-* in this construction as well, (11c).

When such adnominal possessor reflexives are reduplicated under the scope of a distributivity operator, unlike (10), the genitive inflection systematically fails to be reduplicated along with the base.

(12) a. aṅaṅ-siṅ-du **mə-khoy mə-khoy=gi** mə-yum-da cət-khi Meiteilon-TB  
 child-Pl-Dem 3p-pl 3p-pl=Gen 3p-house-Loc go-past  
 'The children went to their respective homes'

- b. kuTTikaL **awar-awar=uTe** wiiTT-il-eek'k'A pooyi Malayalam-DR  
 children they-they=Gen house-Loc-Dat went  
 'The children went to their respective homes'  
 (81: Balusu and Jayaseelan, 2013)

- c. bacca-ra **je-ja=r** baḍi(-te) gɛ-lo Bangla-IA  
 child-Pl dis.pr dis.pr=Gen house-(Loc) go-past  
 'The children went to their respective homes'

#### 4 Analysis

In our examples with the verbal reduplication, the use of the process verb 'walk' is deliberate, since it can be easily used in both kinds of reduplicative structure. The two structures from (5) and (7) are repeated in (13) with respect to Indian English.

- (13) a. She was walking walking smiling.  
 b. She came by walk. / Walking walking she came.

(13a) refers to an event *e*, *she walking*, which has at least one subpart *e'* of *e*, that temporally corresponds to the independent event *E*, of *she smiling*. There is a semantic operator R that links these two events temporally. This operator selects the event *e* as its complement and temporally partitions it with respect to another event *E*. We propose that it is the scope of this operator that triggers reduplication in the predicate of the event *e*. In support of this analysis we present three additional observations about these constructions that follow from it.

- i. These reduplication constructions are not limited to process verbs but extend to achievement verbs like 'find' and 'arrive' as well. For example, consider the Bangla sentence in (14) which uses the reduplicated achievement verb.

- (14) reference-ta khūj-e **pe-te pe-te** paper-ta-r deadline peḍi-ye ja-be  
 reference-cl search-perf get-prt get-prt paper-cl-Gen deadline cross-perf go-fut  
 By the time the reference is found, the paper deadline would have crossed.

However with these, the meaning changes from '*while e, E*' to '*by the time e, E*'. This is because unlike process verbs, achievement verbs do not have the temporal duration necessary for the operator R to temporally partition *e* in the progressive aspect.

- ii. Since the partitioning of the temporal duration of *e* by R results in reduplication, it is predicted that these constructions will be completely ungrammatical without reduplication, and such is the case.

- (15) \*radha **cal-te** hās paḍi Hindi-IA  
 radha walk-prt laugh fall-Fem

- iii. Both subparts of event *e*, the one that temporally coincides with *E* and the one that does not coincide with *E*, are in the same aspectual relation with respect to the knowledge of the speaker. Consequently we expect both copies to be inflected identically, and such is the case. We have not come across any SAL across literature, with this construction where the verb is reduplicated with out the inflection.

- (16) mina-ya methai **khon-ui khon-ui** thabai-duṅ Bodo-TB  
 mina-Nom song sing-Adv sing-Adv walk-prog  
 Mina is walking by singing a song. (54: Brahma 2016)

Unlike (13a), (13b) refers to an event  $e$ , where a process event like 'walk' culminates in a transition event like 'arrive' or 'reach'. Following the analytical pattern of Pustejovsky (1991), the transition from the process of 'walking' to the state of 'not walking' corresponds to the transition from the process of 'not arrived' to the state of 'arrived'.

In contrast to the English 'walk' that can be used in sentences like 'Mary walked/ran to the store' (45: Pustejovsky 1991), in these SALs process events like 'walk' can transition to the state of not walking only if another achievement verb is added. The reduplication of the process verb draws focus to the fact that the event  $e$  of walking was constitutive of a number of temporally distributed sub-events  $e_1$  to  $e_n$ , during all of which 'she walked' and consequently lends discourse salience to the duration of the process. This analysis predicts that:

- i. Since the reduplication is denoting that the process  $e$  is constitutive of sub-events  $e_1$  to  $e_n$ , this construction should be non-felicitous with non-process verbs like 'reach' or 'win', and such is the case.

(17) \*mina pōūch-e pōūch-e dāḍi-ye chi-lo Bangla-IA  
 mina-Nom reach-prt reach-prt stand-prt be-past

- ii. Since the reduplication is triggered by a distributivity operator D that breaks the event  $e$  into its sub-components, and that operator has no scope over the transition from process to the state in the sentence meaning, unlike (5) the sentences in (7) should be felicitous without the reduplication of the process verb as well, and such is the case.

(18) ma čət=lə=gə lak-i Meiteilon-TB  
 3p walk=perf=conj come-Ind  
 'S/he walked and came.'

- iii. The perfective inflection, or a particle, converts the unbounded process of 'walk' with a telic change to a state of 'not walk'. Therefore, semantically the inflection marking this should not be reduplicated. However, whenever the vocabulary item is a non-regular suppletive morpheme, like the verb in perfective aspect in Bangla, the entire special form gets reduplicated rather than just the non-inflected root.

Similar to the verb reduplication in (7), in the suppletive/special forms of the adnominal reflexives get reduplicated together with their inflections while the inflection does not get reduplicated in the case of regular morphology. This lends further morphological support for the standard view in generative theory on reflexives following Reinhart & Reuland (1993) who analyzed the morphologically constructed nature of the reflexive.

## 5 Conclusion

Jelinek and Demers (1997) noted that cross-linguistically reduplication is used as morphological strategy to express quantification over individuals, events, states, processes and qualities. While each one of these is true for most of the languages discussed in this paper, we find that the reduplicative template is determined by the nature of the quantification by the semantic operator on its complement. Further, these operators play a crucial role in varieties of Indian English, and since some of these event compositional strategies might not be present in other languages, produce hilarious English discourse contexts.

For example, Bangla speakers quite commonly use an English phrase with reduplicated pronouns 'his his whose whose'. Quite meaningless to non-Bangla-speakers, this phrase means 'to each...their own', something similar to the English expression 'each man on his own'. The reduplicated structure derives from the Bangla expression in (19).

- (19) je- ja=r še- ta-r  
 dis.pr=Nom dis.pr=Gen 3p-Nom 3p=Gen  
 Each person by them(selves) / going dutch

Bangla-IA

Notice that the reflexives *je ja=r* and *še ta=r* of (19) are morphologically very similar to the DLR object reflexives from (8) like the Meiteilon, *mə-sa=nə mə-sa=bu*. Perhaps there are non-trivial reasons for such similarities. This paper is a preliminary work exploring such vignettes from the scopal effects of reduplication in some of the South Asian Languages.

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<sup>7</sup> **Abbreviations:** Nom-Nominative; Acc-Accusative; Gen-Genitive; Loc-Locative; Prog-Progressive; Perf-Perfective; Asso-Associative; Ind-Indicative; Adv-Adverbial particle; Agr-Agreement; dis.pr-discourse pronominal; prt-particle; cl-classifier; Pl-Plural; Dem-Demonstrative; Nzr-Nominalizer; p-Person; Subj-Subject Marker; Obj- Object Marker; VR-Verbal Reflexive

# The Hindi correlative as an overtly pronounced index

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## ABSTRACT

One of the main defining features of the Hindi correlative construction is the necessity of a demonstrative correlate in the main clause. While previous research has done much to distinguish the correlative from other relativizing structures, such as the postnominal relative clause, it is still unclear what the relationship between the demonstrative and correlative clause is. In order to understand how the correlative clause enters the syntax, it is important to look at the internal structure and the semantic contribution of the demonstrative. In this paper, I will show that the correlative is an overtly pronounced index of the demonstrative, and therefore an argument of the demonstrative rather than adjoined to it. The semantic contribution of the demonstrative itself remain the same.

## 1 Introduction to the correlative construction

The correlative construction<sup>1</sup> is a specialized relativizing structure involving a correlative clause, headed by a relative pronoun, which relates to an indexical correlate in the main clause. Nearly all Modern Indo-Aryan languages have correlative constructions<sup>2</sup>, but they also occur in other Indo-European languages and in a handful of non-Indo-European languages such as Bambara, Basque, Hungarian, and arguably Tibetan (Cable 2009). Several Dravidian languages have correlative constructions, as does Burushaski (an isolate spoken in northern India), arguably due to contact with Indo-Aryan languages. (Bhatt 2003; de Vries 2005; Lipták 2009)

Below is an example of a typical correlative construction in Hindi.

- (1) [ *jo lərki kʰeɽi hɛ* ]      *vo ləmbi hɛ*  
which girl.F.SG standing.F.SG be.PRS.3.SG that tall.F.SG be.PRS.3.SG

'Which girl is standing, that/she is tall' (*from* Dayal 1996)

### 1.1 Terminology

The terms used for the different elements of the correlative construction are not always consistent, differing by theory, author, and type of treatment. In this paper I will refer to the relativizing clause as the *correlative* or correlative clause (*jo lərki kʰeɽi hɛ* 'which girl is standing' in 1), and the corresponding demonstrative as the *correlate* (*vo* 'that' in 1).

The correlative clause headed by a relativizing-*wh* or *relative pronoun* or a *relative phrase*.<sup>3</sup>

### 1.2 Features of the correlative construction

Dayal (in Srivastav 1991 and Dayal 1996) showed that correlative is an independent construction from the postnominal relative and has distinct syntactic features.

The correlative is generally described as having the following features (adapted from Lipták 2009).

<sup>1</sup>For this discussion, I will only be looking at the single headed nominal correlative, leaving aside non-nominal correlatives or specialized variations of correlatives, such as comparatives and conditional clauses, and multi-headed correlatives.

<sup>2</sup>Exceptions as noted by (Bhatt 2003, p. 488) include Southern Konkani, Saurashtri, and Sinhalese.

<sup>3</sup>For the sake of consistency, I will consistently gloss the relative pronoun *jo* as 'which' regardless of the English translation.

(2) Typical features of a correlative construction:

- Occur at the left periphery of the main clause.
- Headed by a relative pronoun or  $wh_{RC}$ .
- The relativized nominal may appear in both the relative clause and the correlative (*headedness*).
- There must be a correlate, either a demonstrative or a pronominal, in the main clause (the *demonstrative requirement*)
- Correlatives license multi-headed relative clauses.

Postnominal relative clauses differ from correlatives in that they are not fronted but follow the relativized nominal, they are not subject to the demonstrative requirement, they cannot be internally headed, they may be indefinite, and they do not license multi-headed relative clauses (Dayal 1996, Ch. 5-6).

## 2 Current analyses

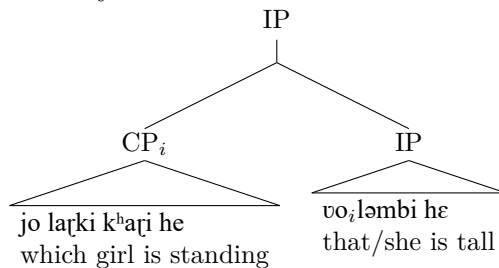
While earlier papers (Downing 1973; Keenan 1985; Andrews 1985) had noted that there were syntactic differences between correlative constructions and the postnominal relative clause, Dayal (in Srivastav 1991 and Dayal 1996) was instrumental in defining the syntactic features of the correlative that distinguish it from other relativization structures. Most recent analyses of correlatives follow Dayal in assuming that the correlative is an independent relativizing structure with syntactic and semantic features distinct from the postnominal relative (including, but not limited to, Grosu and Landman 1998; de Vries 2001, 2005; Bianchi 2002a,b; Bhatt 2003; Bhatt and Lipták 2009; Lipták 2009).

Bhatt (2003) argues that the correlative is a *local* construction. That is, the correlative clause is base generated at the demonstrative phrase itself and may be then fronted to a clause initial position.

### 2.1 The correlative is not a postnominal relative (Dayal 1996)

Having established that the correlative is a distinct construction from the postnominal relative clause, Dayal (1996) proposes the following syntactic structure for the correlative construction, in which the correlative CP is adjoined at IP and, importantly, has not undergone any movement.<sup>4</sup>

(3) Left-Adjoined Hindi Correlative:



<sup>4</sup>Dayal (1996) notes that there are cases where the correlative clause is pronounced at the demonstrative itself and allows for the possibility that the correlative may, optionally but less commonly, be adjoined at the demonstrative.



## 2.2 The correlative is base generated at the DemP (Bhatt 2003)

Bhatt (2003) revisits the question of where the correlative enters the syntax, and argues that the correlative clause is base generated within the same constituent as the demonstrative phrase (DemP). The correlative may then be raised to a fronted position at the left periphery.

It is possible for the correlative clause to be pronounced inside of the main clause, at the correlate phrase (as in example 4).

- (4) ram [jo si.di sel pər hɛ] us si.di ko k<sup>h</sup>aridega  
 Raam which CD sale on be.PRS.3.SG that.OBL CD ACC buy.FUT.3.M.SG

'Raam will buy which CD is on sale, that CD.' (*adapted from* Bhatt 2003)

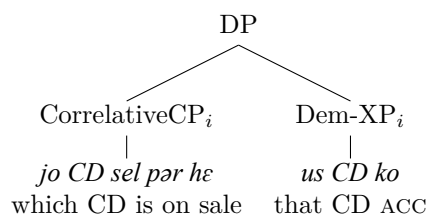
Bhatt (2003) argues that the correlative not only can be, but must be, generated at the DemP. The first evidence for this is that correlative CPs are subject to island effects; a fronted correlative cannot be related to or modify a DemP inside of a relative clause island. This shows both that the correlative has moved, and that the correlative construction behaves differently than variable binding as Dayal (1996) had suggested.

Secondly, correlatives are subject to the Coordinate Structure Constraint; where two correlativized demonstrative phrases are coordinate, neither correlative can be fronted. This is evidence that the correlative clause and demonstrative are part of the same constituent.

Further, reconstruction effects for both variable binding and quantifier binding show that the correlative is interpreted at the demonstrative phrase, ruling out readings which would have been possible had the correlative been adjoined at IP.

Bhatt concludes that the correlative CP and the DemP are base generated as part of the same constituent, with the correlative clause adjoined above the demonstrative phrase. The correlative clause may then undergo movement to a fronted position, but it is interpreted at its trace position at LF.

- (5) a. [ [ CorrelCP ] [<sub>DemP</sub> Dem NP ] ]  
 b.



## 2.3 Remaining questions

Previous research shows that the correlative construction is a distinct construction from the postnominal relative and is merged at the demonstrative phrase. But, it remains unclear what the relationship between the correlative and the correlate is, both syntactically and semantically.

In the next section, I propose that it is the semantics of the demonstrative itself which is the key to understanding how these structures are constructed.

## 3 The correlative as an index of the demonstrative

The key to analyzing the correlative construction lies in the underlying structure and semantic composition of the demonstrative itself. Following Nunberg (1993) and Elbourne (2008)'s analysis

of the internal structure of the demonstrative, I will show that the single headed, nominal correlative clause is an overt pronunciation of the index of the demonstrative.

### 3.1 The semantics and internal structure of the demonstrative

Nunberg (1993) shows that indexicals, or expressions which carry an index, are made up of four components: the classificatory component, the relational component, the deictic component which picks out an index, and the interpretation within the main clause.

The *classificatory component* includes the phi-features (gender, number, person) and animacy features. The *deictic component* identifies the index through gesturing and, in the case of the demonstrative, giving information about proximity. The *relational component* is the contextually defined relationship between the index and its interpretation. The relationship itself is not defined within the syntax but is dependent on the pragmatic accessibility of the relation.

Elbourne (2008, building on Nunberg 1993) formalizes the components of the demonstrative, proposing the following internal structure for the demonstrative.

$$(6) \quad [_{DemP} [ [ \text{that } i ] R ] NP ]$$

The index  $i$  is a lexical item which is interpreted by means of *Variable Interpretation*.

$$(7) \quad \textit{Variable Interpretation} \text{ (Elbourne 2008)}$$

For all natural numbers  $n$  and assignment functions  $g$ , if  $i_n$  is a variable with subscript  $n$ , then

$$\llbracket i(n) \rrbracket \wedge g = g(n)$$

provided  $n$  is in the domain of  $g$ ;  $\llbracket i(n) \rrbracket \wedge g$  is undefined otherwise.

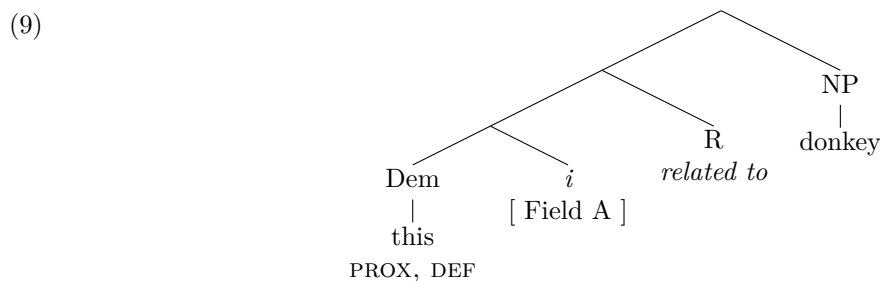
$R$  is the contextually defined relation between the index  $i$  and the interpretation of type  $e$ , where this individual has the property denoted by  $NP$ . The demonstrative morpheme *this* or *that* carries information about proximity and definiteness.

In order to see what each components contribute, consider an example in which the index and the interpretation are not the same.

$$(8) \quad \textit{A farmer keeps a donkey in a certain field. The farmer points at the field and says,} \\ \text{That donkey [gesturing at Field A] is not healthy.}$$

Importantly, the speaker can make the above statement whether or not the donkey is actually in the field. The meaning of the index, then, is not the donkey itself. Instead, *this donkey* picks out 'field' as the index, where the field represents the donkey who lives in it.

The full demonstrative phrase, *this donkey*, has the following structure,<sup>5</sup> along with the semantic contribution of each component (Elbourne 2008).



<sup>5</sup>A simple mirroring of the demonstrative and the index gives us the proper Hindi word order for the demonstrative while retaining the appropriate hierarchal relations, reflects that Hindi is right-headed, and avoids a violation of the Final Over Final Constraint (FOFC).



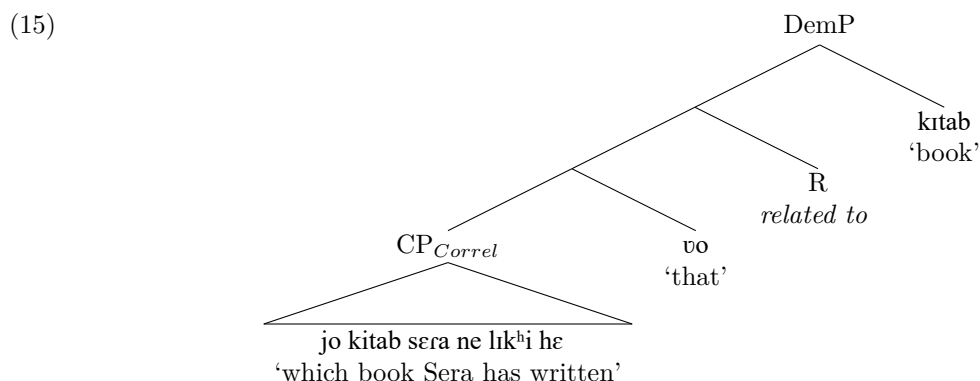
For now, assume that the correlative contributes the following semantics. Note that I am using a simplified notation for tense and aspect, as it is not relevant to the current discussion.

- (14) Semantic composition of the correlative clause (preliminary)  
 $\llbracket \text{which book Sera wrote} \rrbracket = \llbracket \text{BOOK} \rrbracket =$   
 $\iota x. \exists e. x \text{ is a book}_{RC} \text{ in } e \wedge \text{write}(e) \wedge \text{agt}(e, \text{Sera}) \wedge \text{pt}(e, x) \wedge \text{PERF}(e) \wedge \text{PRS}(e)$

*The unique  $x$  such that  $x$  is a book and there is an event of Sera writing  $x$ .*

Because there are two NP's *kitab* 'book', I have included a subscript to show which clause the NP is included within. I will call the semantic contribution of the correlative  $\llbracket \text{BOOK} \rrbracket$  so that the following calculations are more transparent.

Turning to the demonstrative phrase, the semantic composition of the demonstrative and the components within it are the same as the demonstrative in a normal (i.e., non-relativizing) context, repeated below.



Each component has the same semantic contribution as shown in (9). Here, R is an identity relation between the book Sera has written and some individual  $z$  where  $z$  also has the property of being a book.

Recall that Bhatt (2003) analyzes the correlative-demonstrative as having the following constituent structure.

- (16)  $\llbracket [\text{Cor}(\text{rel})] [\text{DemP}] \rrbracket$

Like Bhatt's analysis, the correlative, the demonstrative, and the NP are all part of a single constituent. Under this analysis, though, the relationship between the correlative CP and the demonstrative correlate follows directly from the internal structure of the demonstrative itself.

The correlative-correlate constituent, where the correlative CP is an argument of the DemP, has the following semantic contribution.

- (17)  $\llbracket \text{which book Sera wrote, that R book} \rrbracket =$   
 $\iota z. z \text{ is book}_{MC} \text{ in } e \wedge z = \iota x. \exists e. x \text{ is a book}_{RC} \text{ in } e \wedge \text{write}(e) \wedge \text{agt}(e, \text{Sera}) \wedge \text{pt}(e, x) \wedge$   
 $\text{PERF}(e) \wedge \text{PRS}(e) \wedge \text{distal}(x, a, t)$

*The unique  $z$  such that  $z$  is a book<sub>MC</sub>, and there is a unique, presupposed  $x$  such that  $z$  equals  $x$ , and  $x$  is a book<sub>RC</sub>, and there is an event  $e$  such that  $e$  is an event of Sera writing  $x$  and  $x$  is distal.*

### 3.3 Conclusion and Implications

It is not a coincidence that the correlate must be either a demonstrative, pronoun, or other indexical. In fact, it is their very indexicality which allows the correlative clause to enter the syntax. The correlative clause itself is an overtly pronounced index of the demonstrative phrase, and an argument of the demonstrative itself.

This analysis predicts various features of the correlative construction, such as independent case marking and the ability of each clause to be independently headed.

In many papers, it is assumed that the head<sub>RC</sub> and the head<sub>MC</sub> must be the same, but this is not actually the case.<sup>6</sup> (This was also noted by McCawley 2004, and Dayal 1996 includes a few examples as well.)

- (18) [ jis            adhivapək    ne    us-            ki            klas                    ko    tʃaklet    di ]  
 which.S.OBL teacher.F.SG ERG that.OBL of.F.SG class.M.SG.OBL ACC candy.F give.PFV.F  
 vo    ɔrət        səb-    se        atʃʰ:i        adhivapək    he  
 that woman all- from good.F.SG teacher.F.SG be.PRS.3.SG  
 'Which teacher gave her class candy, that woman is the best teacher.'

This follows from the fact that the two NPs – for example, *adhivapək* ‘teacher’ in the correlative clause and *ɔrət* ‘woman’ in the demonstrative phrase of the main clause – are generated independently and each make their own semantic contribution.

Another characteristic of correlatives is that each of the NPs can have independent case marking. This is difficult to account for in terms of copying or spell out but follows easily from an indexical analysis of the correlative.

- (19) [ jis-            se    mē    battʃit                    kar    rəhi            tʰi ]  
 which.OBL with I.F.SG conversation.M.SG do    PROG.F.SG PST.F.SG  
us            mistri        ne    mera            baik                    mərəmət    kiya  
 that.OBL mechanic ERG my.M.SG motorcycle.M.SG repair    do.PFV.M.SG  
 'Who I was talking with, that mechanic fixed my motorcycle.'

In order to understand how the correlative clause is able to enter the syntax, it is necessary to look not only at the syntactic features of the construction but also to the semantic composition of the demonstrative itself. The demonstrative and other indexicals are made up of separate components which each have their own semantic contribution (Nunberg 1993). These components translate to a syntactic structure which includes the index, not only as a semantic notion but which is in fact a lexical item within the syntactic structure (Elbourne 2008).

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<sup>6</sup>This example comes from my own fieldwork in Hindi-Urdu as spoken in Nizamuddin, Delhi, India.

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# A Movement Approach for Multi-Head Correlatives

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## ABSTRACT<sup>1</sup>

The goal of this paper is to provide a semantic analysis of multi-head correlatives in Hindi/Urdu that takes their peculiar behavior regarding NPI licensing and islands into account. This is done by assuming movement, which has the benefit of being a recursive process that can be used for an arbitrary amount of heads without resorting to type shifting or additional rules of composition.

## 1 The Phenomenon

Correlatives are biclausal structures which consist of a correlative phrase (CorrXP) that contains a relative phrase (RelXP) and a matrix clause that contains a demonstrative phrase (DemXP) referring to what is described by the relative.

- (1) jo laṛki: khari: hai vo lambii hai  
Rel girl standing.F be.Prs Dem tall.F be.Prs  
[[Rel girl]<sub>RelXP</sub> standing is]<sub>CorrXP</sub> [she]<sub>DemXP</sub> tall is  
'Which girl is standing, she is tall.' (Srivastav 1991)

These can also come in the form of multi-head correlatives, in which there are two or more pairs of relative and demonstrative items:

- (2) jis=ne jo kar-na: cha:h-a us=ne vo ki-ya:  
Rel=Erg Rel do-Ger want-Pfv Dem=Erg Dem do-pfv  
[[Rel]<sub>RelXP1</sub> [Rel]<sub>RelXP2</sub> do want]<sub>CorrXP</sub> [Dem]<sub>DemXP1</sub> [Dem]<sub>DemXP2</sub> do  
'Who wanted to do what, that one did that.' (Bhatt 2003)

This seems to be a recursive process, as it allows for arbitrarily many pairs and is still grammatical.

- (3) Jo jis=ko jis-se milaata hai vo us=ko us=ka naam bataata hai  
Rel Rel=Acc Rel-to introduce be.Prs Dem Dem=Acc Dem=Gen name tell be.Prs  
'Who1 introduces who2 to whom3, he1 tells him3 his2 name.'

It is also noteworthy that there seems to be a strict pattern of uniqueness. A single-head correlative always refers to a unique entity. In correlatives with three or more heads, speakers prefer a universal reading, as noted in Brasoveanu (2008). Two headed correlatives depend on context and on the speaker at hand. While some speakers only accept a universal/unique reading, others only accept unique/unique (also noted in Brasoveanu 2008). (2) would allow for these readings:

- a. The unique person x wanted to do the unique thing y and x did y. (unique)
- b. For all persons x that wanted to do a thing y, x did y. (universal)

But no matter how many heads, the uniqueness effect can be dispelled through plural or habitual marking.

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<sup>1</sup>I am deeply indebted to my informants, some of who put in far more patience than could reasonably be expected.

## 2 Single-Head Correlatives

Regarding the syntax of correlatives, Bhatt (2003) makes a quite convincing argument that in single-head correlatives, the CorrXP is base generated adjoined to the DemXP and then moved, while multi-headed CorrXPs are base generated in an IP adjoined position.

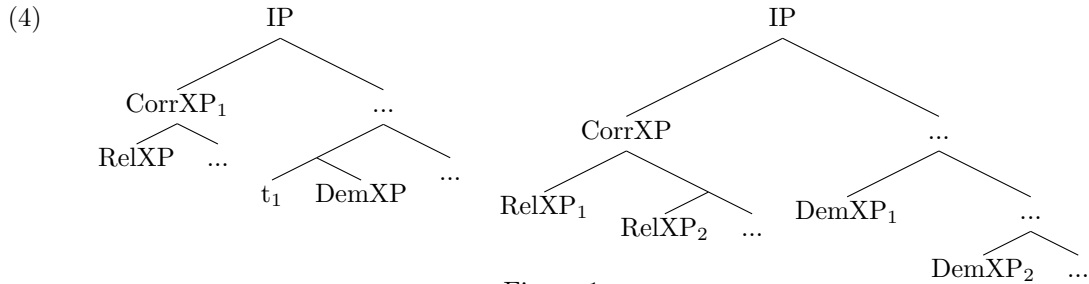


Figure 1

As for the interpretation of these constructions, the assumption is, that, in single-head correlatives, at the level of logical form, a copy of the correlative clause is interpreted in its base position (Bhatt 2003). The resulting LF is then analogous to Elbourne (2005)'s Voldemort phrases, which are named after the currently probably best-known example of these constructions:

(5) He who must not be named.

They are "pronouns combining with restrictive relative clauses to form definite descriptions" (Elbourne 2013), which seems to be an apt description for the structures that we encounter in Hindi/Urdu. My argument will be that single-head correlatives are Voldemort phrases and can be treated exactly like them and that multi-head correlatives try to mimic these structures via movement and use more or less the same machinery.

Elbourne (2013)'s interpretation of these constructions assumes that pronouns consist of two parts: a definite article and an NP that is usually phonologically null. This NP contains only basic information like 'person'. The relative clause that is used to form a Voldemort phrase attaches to this covert NP. This means that the whole Voldemort phrase essentially means "The person who must not be named". Transferring this concept onto the correlative in (1) would give us an LF that roughly looks like this:

(6) Which girl is standing, she is tall.  
 [The [[NP] [which girl is standing]]] is tall  
 'The unique standing girl is tall.'

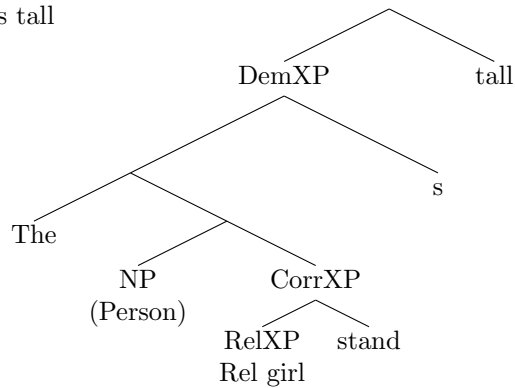


Figure 2

Beshears (2016) independently proposed a very similar analysis for single-head correlatives, in which the pronoun is a demonstrative. Elbourne (2008) assumes that demonstratives are similar to definite descriptions. They create the unique individual that is in a salient relation to some other individual,



which is usually provided via extralinguistic means. Beshears (2016) takes the correlative to be an overt representation of the second individual. The resulting LF looks like this:

(7) [R[that [which girl stand]]]tall

This assumes the mechanisms presented in Elbourne (2008) in order to work. In Elbourne (2013), he is "inclined to back-pedal a little" (p.203). However, using the analysis of descriptive indexicals in Elbourne (2013) instead, Beshears (2016)'s analysis can be transferred with next to no changes. The Dem item becomes a pronoun and the CorrXP takes the place of the usually covert, now overt, NP. This seems especially unproblematic for Hindi/Urdu, since it "does not have third person pronouns that are distinct from (distal) demonstratives. Distal demonstratives in Hindi serve as third person pronouns both in their deictic and bound usage" (Bhatt 2003, p.496). The only thing that is lost is the direct integration of the second individual and the relation. But we can follow Elbourne (2013) and assume that the covert NP contains the needed descriptive content that describes this relation. Since Elbourne (2013) assumes that pronouns have to contain a covert NP anyway, we can stick to this and intersect the covert NP with the CorrXP. The LF then changes into this:

(8) [The [[NP][which girl stand]]]tall

This is exactly what the Voldemort analysis produced. It seems safe to assume that, when formalized in the same framework, both analyses are exactly identical. However, analyses of this kind face problems with multi-head correlatives: Since the CorrXP is already base generated adjoined to IP, it cannot be used to form a Voldemort phrase, especially since it would need to be split up into several parts, each of which would need to be adjoined to a different DemXP.

### 3 Extending to Multi-Head Correlatives

Most existing accounts for Multi-Head Correlatives (Dayal 1995, 1996, Bhatt 2003, Gajewski 2008, among others) assume that at LF, the CorrXP is adjoined to the IP that contains all DemXPs.

(9) Jis lar̥ki:=ne jis lar̥ke-ke saath khelaa us=ne us=ko haraayaa  
 Rel<sub>1</sub> girl=Erg Rel<sub>2</sub> boy-with play Dem<sub>1</sub>=Erg Dem<sub>2</sub>=Acc defeated  
 'Which girl played with which boy, she defeated him' (Gajewski 2008)

The standard assumption would be that an IP denotes a proposition. Under this assumption, it would be beneficial if the CorrXP had the same denotation. To get this result, it seems sensible to assume that the RelXPs denote individuals. To get this, I will assume that the Rel item is a definite article or a pronoun. Under this assumption, there now are pairs of definite descriptions in the CorrXP and pronouns in the matrix clause, which ideally should refer to the same thing, but currently have no real reason to. The solution is to 'restore' the order that is found in the single-head correlative, namely that of a Voldemort phrase: The DemXPs move on top of the correlative, similar to what has been assumed for South Slavic correlatives in Izvorski (1996). Moving the DemXP has been discounted as a usable analysis for Hindi/Urdu correlatives in Bhatt (2003), but, crucially, only if it involves covert movement over a finite clause boundary. This is not what happens here, since the moved elements get adjoined to IP and stay within the clause. An argument in favor of this comes from structures like the following:

(10) [us=ne jis lar̥ke=ko jo kita:b di-i]1 [ har lar̥ki soch-ti: hai [ ki t1 [ us  
 Dem=Erg Rel boy=Dat Rel book.F give-Pfv.F every girl think-Hab.F be.Prs that Dem  
 lar̥ke=ko vo kita:b pasand a:-yegi:]]]  
 boy=Dat Dem book.F like 'come'-Fut.F  
 'Every girl<sub>i</sub> thinks that for book x, boy y s.t she<sub>i</sub> gave x to y, y will like x.' (Bhatt 2003)

In this example, a quantifier in the matrix clause is able to bind a pronoun in the CorrXP. This implies that things can be moved on top of the CorrXP without leaving the finite clause. With this movement, an outline of the LF for (9) would look like this:

(9)

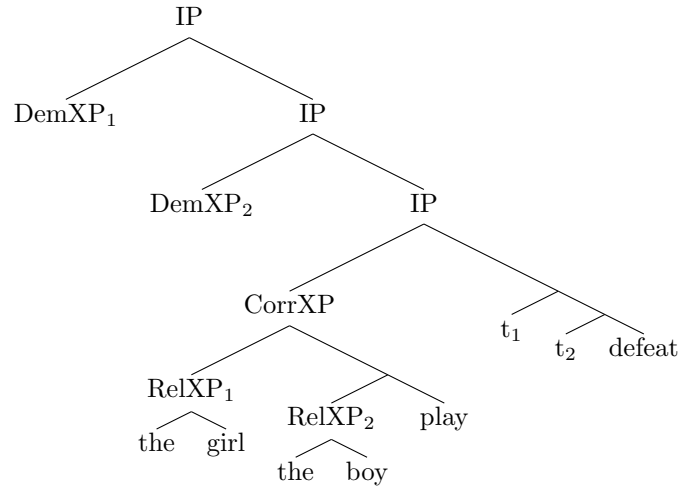


Figure 3

Now, the moved DemXP binds the RelXP, as well as the corresponding trace. C-commanded definite descriptions can be bound in such a way as shown by Wilson (1984) among others. Elbourne (2013) offers a mechanism for this that assumes that they get bound in the same way as donkey anaphoras, namely via situation binding. The meaning of a RelXP now boils down to "The unique girl in the relevant situation", where the movement of the DemXPs binds the situation. For (9), this results in roughly these preliminary truth conditions:

(11)  $\lambda s. \iota x$  in  $s$ :  $\iota y$  in  $s$ : ( $\iota a$  in  $s$ :  $\text{girl}(a)$  &  $\iota b$  in  $s$ :  $\text{boy}(b)$ ).  $x$  defeated  $y$ .

The unique  $x$  and  $y$  are such that  $x$  is the unique girl playing the unique boy  $y$ .  $x$  defeated  $y$ .

This seems to be going in the right direction, but it would be weak crossover. However, as has been noted by Pandit (1985, 1987) among others, Hindi is not that strict regarding these effects:

(12) Raam=ka usake maan baap-se milanaa har larakii=ko acchaa lagataa hai  
 Ram=Gen her parents-with meeting every girl=Acc please happen be.Prs  
 'Ram's meeting her parents pleases every girl.' (Pandit 1985)

(13) Harii=kii is gavaahii=ne ki unhone javaaharaat curaaaye the sab=ko  
 Hari=Gen this statement=Erg that they jewels steal did them=Acc  
 giraftaar karavaa diyaa  
 arrested got  
 'Hari's statement that they had stolen the jewels got all of them arrested.' (Pandit 1987)

Pandit proposes a constraint on crossover constructions for Hindi/Urdu that is a bit weaker than for example in English:

(14) A pronoun cannot be bound to a variable in cross over in Hindi unless the pronoun occurs in an embedded sentence. (Pandit 1987)

Since the bound elements in question are indeed embedded within another CP, this is not a problem.

#### 4 Deriving (Non-)Uniqueness

As mentioned above, in general, single-head correlatives have a unique reading, two heads allow for either unique or universal and three or more heads are read universal. The uniqueness of single head correlatives is unproblematically predicted, since they are essentially definite descriptions. Multi-head correlatives on the other hand are a different breed under this analysis. The keen observer will have noticed that I avoided the topic of how CorrXP and matrix clause are actually combined. I will use the conditional for this. Correlatives have been analyzed as conditionals (and the other way around) before (Arsenijević 2009, Bhatt and Pancheva 1987, Bittner 2001, among others) and some

languages such as Lhasa Tibetan (Cable 2005, 2009) even use the conditional marker to also mark correlatives.

But assuming a conditional here will cause a problem: If the DemXPs get raised above the conditional, only the unique reading is still available since the definite article takes scope over the conditional. Additionally, this is not the desired reading but something along the lines of "The unique girl and the unique boy are such that each time they play, she defeats him."

I would instead propose that the DemXPs in multi-head correlatives are not definite descriptions, but instead denote kinds. This is more or less expected if we assume that multi-head correlatives are close relatives of Voldemort phrases. Voldemort phrases can do the same thing as has been shown by Zobel (2015). Her analysis of Voldemort phrases in generic sentences (based on the account for definite singular NPs presented in Dayal 2004), shifts the covert NP and the attached relative clause to a property of kinds. After this, the definite article reduces it to the unique kind. As Zobel (2015) notes, "if a kind-denoting definite singular noun phrase combines with an object-level predicate, the result is a characterizing sentence that expresses a generalization about the members of the kind-entity (cf. Krifka 1995, Chierchia 1998)." To capture this, she uses Chierchia (1998)'s 'member-of' relation, which "holds between an individual  $y$  and a kind  $X$  in a situation  $s$  iff  $y$  instantiates  $X$  in  $s$ , i.e. iff the property of individuals at the core of  $X$  is true of  $y$  in  $s$ ."

Finally, the generic operator 'Gen' is applied. I would follow Zobel (2015) in assuming that Gen is a modalized universal quantifier, similar to overt 'usually' or 'normally' (c.f. Krifka 1995, Mari et al. 2013). A complete LF for the universal reading of (9) would look like this:

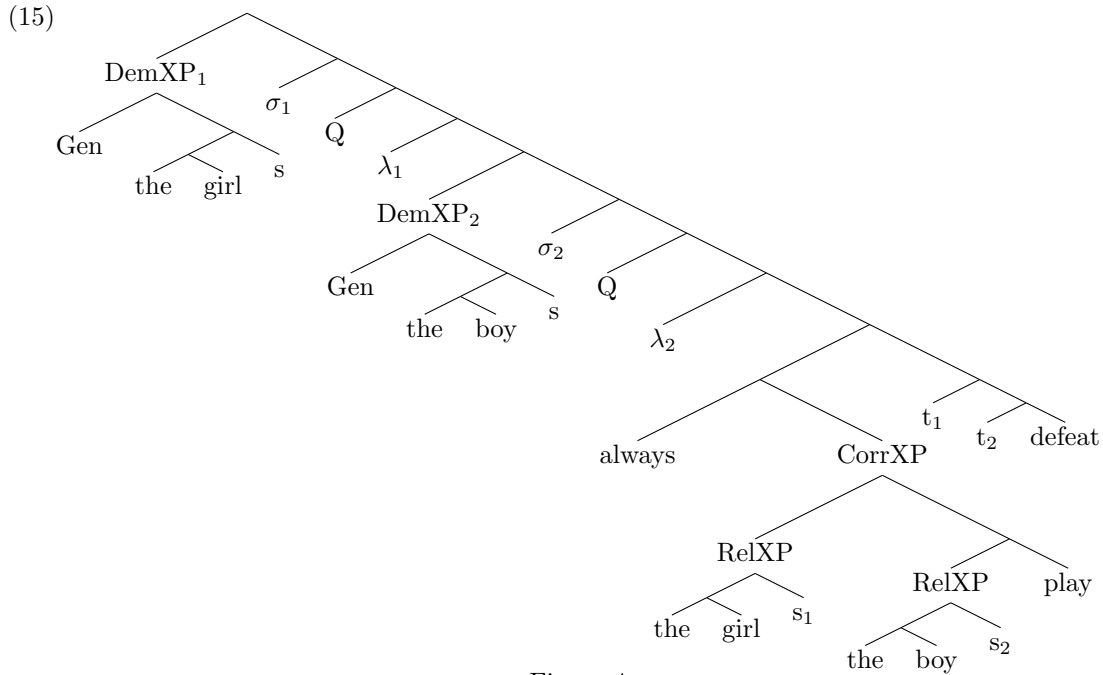


Figure 4

Calculating the RelXPs following Zobel (2015) shifts the NP from property to kind and then applies the definite article. The result is this:

(16)  $\iota X$ : GIRL( $X$ )

To be able to apply this to the rest, the member-of relation is needed:

(17)  $\lambda y.\lambda s.member-of( $y$ )( $\iota X$ : GIRL( $X$ ))( $s$ )$

After this, Gen can be applied, resulting in (19)

(18)  $\llbracket \text{Gen} \rrbracket = \lambda f_{\langle e, st \rangle} . \lambda g_{\langle e, sst \rangle} . \lambda s. \forall s' \forall x [s' \text{ is a minimal situation such that } s' \leq s \text{ and normal in } s' \rightarrow f(x, s') \rightarrow g(x, s')]$

$s$  and  $f(x)(s') \rightarrow g(x)(s)(s')$

- (19)  $\lambda g_{\langle e, sst \rangle} . \lambda s . \forall s' \forall x [s' \text{ is a minimal situation such that } s' \leq s \text{ and normal in } s \text{ and } x \text{ is a normal member of girlkind} \rightarrow g(x)(s)(s')]$

The conditional will result in something like this:

- (20)  $\lambda s . \forall s' \text{ accessible from } s : \text{ if the in } s_1 \text{ unique girl plays the in } s_2 \text{ unique boy in } s', g(1) \text{ defeats } g(2) \text{ in } s'$

After predicate abstraction, the conditional gets combined with Q, resulting in (22).

- (21)  $\llbracket Q \rrbracket = \lambda f_{\langle e, st \rangle} . \lambda x . \lambda s . \lambda s' . \exists s'' [s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s \text{ and } f(x)(s'')]$   
(Elbourne 2013)

- (22)  $\lambda x . \lambda s . \lambda s' . \exists s'' [s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s \text{ and } \forall s''' \text{ accessible from } s'' : \text{ if the in } s_1 \text{ unique girl plays the in } s_2 \text{ unique boy in } s''', g(1) \text{ defeats } x \text{ in } s''']]$

The next step is situation binding via the operator  $\sigma$ . This results in (24).

- (23) Situation Binding III (Elbourne 2013)

For all indices  $i$  and assignments  $g$ ,  $\llbracket \sigma_i \alpha \rrbracket^g = \lambda x . \lambda s . \lambda s' . \llbracket \alpha \rrbracket^{g^{s'/i}}(x)(s)(s')$

- (24)  $\lambda x . \lambda s . \lambda s' . \exists s'' [s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s \text{ and } \forall s''' \text{ accessible from } s'' : \text{ if the in } s_1 \text{ unique girl plays the in } s' \text{ unique boy in } s''', g(1) \text{ defeats } x \text{ in } s''']]$

This is now combined with RelXP<sub>2</sub>

- (25)  $\lambda s . \forall s' \forall x [s' \text{ is a minimal situation such that } s' \leq s \text{ and normal in } s \text{ and } x \text{ is a normal member of boykind} \rightarrow \exists s'' [s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s \text{ and } \forall s''' \text{ accessible from } s'' : \text{ if the in } s_1 \text{ unique girl plays the in } s' \text{ unique boy in } s''', g(1) \text{ defeats } x \text{ in } s''']]$

Rinse and repeat for RelXP<sub>1</sub> and its friends:

- (26)  $\lambda s^V . \forall s^{VI} \forall y [s^{VI} \text{ is a minimal situation such that } s^{VI} \leq s^V \text{ and normal in } s^V \text{ and } y \text{ is a normal member of girlkind} \rightarrow \exists s^{IV} [s^{IV} \text{ is a minimal situation such that } s^{VI} \leq s^{IV} \text{ and } s^{IV} \leq s^V \text{ and } \forall s' \forall x [s' \text{ is a minimal situation such that } s' \leq s^{IV} \text{ and normal in } s^{IV} \text{ and } x \text{ is a normal member of boykind} \rightarrow \exists s'' [s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s^{IV} \text{ and } \forall s''' \text{ accessible from } s'' : \text{ if the in } s^{VI} \text{ unique girl plays the in } s' \text{ unique boy in } s''', y \text{ defeats } x \text{ in } s''']]]]$

This seems right, but requires a bit of cheating: The DemXPs do not actually contain girl or boy out of which one could form a kind. They only contain a null NP. So there is no restriction that would allow us to form a kind. This is less of a problem than one might think, though: Elbourne (2013) assumes that the NP is null because of NP deletion. Deletion like this is only possible if a. the NP is either some irrelevant restriction like person, which is not the case here, or b. if there is a strong visual hint as to its content or c. if there is a usable antecedent. Which there is in form of the corresponding RelXP. We can therefore assume that the DemXP contains a deleted copy of the NP that is in the corresponding RelXP. It should be mentioned though, that the RelXP as well as the DemXP might not contain an overt NP, as is the case in (2) or (3). However, even in these cases, the null NP still contains some information, which might be as basic as a case feature or theta role. But this is actually enough. As long as no two DemXPs create the same kind, everything works and we can use Zobel (2015)'s analysis.

Admittedly, I have deviated from Zobel (2015) in one important aspect, namely in assuming the conditional. However, not doing so would have significant consequences: The conditional is what currently allows us to derive the non-unique reading, since it distributes the uniqueness effect over different situations. Using modification instead would get the following truth conditions:

- (27)  $\lambda s^V . \forall s^{VI} \forall y [s^{VI} \text{ is a minimal situation such that } s^{VI} \leq s^V \text{ and normal in } s^V \text{ and } y \text{ is a normal member of girlkind} \rightarrow \exists s^{IV} [s^{IV} \text{ is a minimal situation such that } s^{VI} \leq s^{IV} \text{ and } s^{IV} \leq s^V \text{ and } \forall s' \forall x [s' \text{ is a minimal situation such that } s' \leq s^{IV} \text{ and normal in } s^{IV} \text{ and } x \text{ is a normal member of}$

boykind  $\rightarrow \exists s'' [s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s^{IV} \text{ and the in } s^{VI} \text{ unique girl plays the in } s' \text{ unique boy in } s'' \text{ and } y \text{ defeats } x \text{ in } s'']]$

This cannot work as a generic sentence anymore, since it states that all normal situations are ones in which exactly one girl plays and defeats exactly one boy. Since it cannot work without it, I will assume that Gen is only licensed if the conditional is present. If we remove Gen, too, we get the following:

(28)

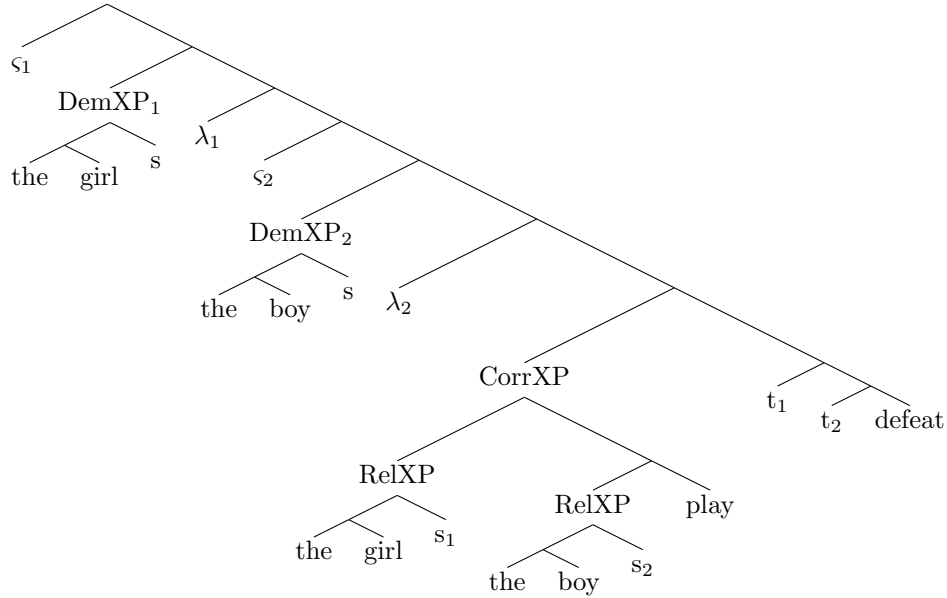


Figure 5

Note that in this tree,  $\sigma$  and  $Q$  have vanished, but  $\zeta$  has popped up. This is due to the fact that without Gen, the DemXPs are not quantified anymore, but denote entities. In this case, the machinery for situation binding is slightly different. at the level of  $\lambda_2$ , we have the following:

(29)  $\lambda x.\lambda s.$  the unique girl in  $s_1$  plays the unique boy in  $s_2$  in  $s$  and  $g(1)$  defeats  $x$  in  $s$

This is combined with the much simpler, non-generic DemXP

(30)  $\lambda s.$  the unique girl in  $s_1$  plays the unique boy in  $s_2$  in  $s$  and  $g(1)$  defeats the unique boy in  $s$

After this,  $\zeta$  is applied, resulting in (29):

(31) Situation Binding I (Elbourne 2013)

For all indices  $i$  and assignments  $g$ ,  $[[\zeta_i \alpha]]^g = \lambda s. [[\alpha]]^{g^{s/i}}(s)$

(32)  $\lambda s.$  the unique girl in  $s_1$  plays the unique boy in  $s$  in  $s$  and  $g(1)$  defeats the unique boy in  $s$

Repeat for DemXP<sub>1</sub>:

(33)  $\lambda s.$  the unique girl in  $s$  plays the unique boy in  $s$  and the unique girl in  $s$  defeats the unique boy in  $s$

These are exactly the truth conditions one would expect from the unique reading. Deriving the unique reading is unproblematic, as soon as the DemXPs moved on top of the CorrXP, mimicing a multiple Voldemort phrase. The same structure can derive the non-unique reading. In this case, the DemXPs denote kinds and CorrXP and matrix clause combine via the conditional. Note that my approach currently allows for correlatives with three or more heads to receive a unique reading. This is problematic and I currently have no solution for this problem and am not aware of a solution in the literature.

## 5 NPI-Licensing

Lahiri (1998) notes that in the CorrXP, NPIs are licensed as in the following example:

- (34) jis laṛke=ne jis laṛkii=ko kahiiN bhii dekhaa us laṛke=ne us laṛkii=ko pasand kiyaa  
 Rel boy=erg Rel girl=Acc anywhere saw Dem boy=Erg Dem girl=Acc like Past  
 Only:  $\forall x\forall y[\text{boy}(x) \ \& \ \text{girl}(y) \ \& \ x \text{ saw } y \text{ anywhere}][x \text{ liked } y]$  (Lahiri 1998)
- (35) \*jis laṛke=ne jis laṛkii=ko dekhaa us laṛkee=ne us laṛkii=ko kahiiN bhii pasand kiyaa  
 Rel boy=erg Rel girl=Acc saw Dem boy=Erg Dem girl=Acc anywhere like Past  
 \*'Every boy who saw a girl liked her anywhere.' (Lahiri 1998)

Note that while an NPI is present, the only available reading is the non-unique one, which is entirely analogous to the behavior of NPIs in Voldemort phrases. While (36) a. allows for a unique reading that references one specific entity, (36) b. cannot refer to one specific entity anymore, especially not this entity.

- (36) a. He who must not be named  
 b. He who wears any glasses

Lahiri (1998)'s analysis of this pattern in correlatives is that the non-unique reading is due to a distributivity operator that contains a universal quantifier, which licenses NPIs in its first argument. This is equivalent to the conditional that I assume.

However, Lahiri (1998) only provides examples where the NPI is in the CorrXP, but crucially not in the actual RelXP. This is kind of interesting: Some approaches to multi-head correlatives (e.g., Gajewski 2008) construct the CorrXP along the lines of a multi-head free relative, which makes the entirety of it a definite description that outputs a tuple of entities which can then be combined with the multi-place predicate that is the matrix clause. A non-unique reading is derived by applying the pluralization operator \* (Link 1983). An analysis like this would not predict that the RelXPs behave differently from the rest of the CorrXP. My approach, on the other hand, would predict that in the actual RelXP an NPI would not be licensed, since the RelXP is a definite description which is a known intervener for NPI licensing (Giannakidou 2006, Guerzoni and Sharvit 2007, Lahiri 1998, among others). This prediction seems to be correct:

- (37) \*jis kahiiN-ki bhii laṛkii=ne jis laṛke=ke saath khelaa us=ne us=ko haraayaa  
 Rel anywhere-from girl=erg Rel boy=Acc play with Dem=Erg Dem=Acc defeat  
 \*'Which girl from anywhere plays against which boy, she defeats him'
- (38) jis UMass-ki laṛkii=ne jis laṛke=ke saath khelaa us=ne us=ko haraayaa  
 Rel UMass-from girl=Erg Rel boy=Acc play with Dem=Erg Dem=Acc defeat  
 'Which girl from UMass plays against which boy, she defeats him'

## 6 Island Effects

Since this approach relies on movement, it should be able to make predictions specific to that mechanism, i.e. we should be able to produce island effects. It has been argued that in Indoaryan languages such as Hindi/Urdu, covert movement out of finite clauses does not work (Mahajan 1990, Srivastav 1991, Dayal 1996, Bhatt 2003, among others). This means that if one of the DemXPs is embedded in a finite CP, this approach would predict that the sentence becomes ungrammatical. This is (as noted in Bhatt 2003, among others) indeed the case:

- (39) \*jis=ne jis=ko dekhaa us=ne kah-aa ki vo aa-yega:  
 Rel=Erg Rel=Acc saw Dem=Erg said that Dem will come  
 \*'Who saw who, he said that he will come.' (via Wali 1982 via Dayal 1996 via Bhatt 2003)

This is straightforwardly predicted by my account and any other that covertly moves the Dem items to the front of the construction. Any non-movement approach (e.g., Dayal 1996, among others) would need to derive the ungrammaticality of these examples differently, for example by assuming that the

correlative contains an operator that binds Dem, but can only bind locally (e.g., Dayal 1996). As Bhatt (2003) points out, variable binding does not display island effects, so using an operator for correlatives instead should produce an effect that is crosslinguistically stable, since "operators in natural language not only must bind variables, they must bind them locally" (Dayal 1996, p.185). Evidence against this comes from Cable (2009)'s observations on correlatives in Lhasa Tibetan:

- (40) Khyodra=s mogmog gare njos na nga=s de bzo mkhan gyi bsad mkhan de ngozhi  
 You=Erg Momo what buy if I=Erg that make Agnt Gen kill Agnt the know  
 gi yod  
 non.Past Aux  
 'Which Momos you bought, I know the one who killed the one who made them.'  
 (Cable 2009)

Even though this is a Single-Head Corelative, it is, as argued for in Cable (2009), not one that was moved, but one that is base generated outside of the clause that contains the DemXP. So the setting seems quite comparable. If we accept Cable (2009)'s analysis that the CorrXP did not originate lower down in the structure and moved upwards, we cannot use an operator that is part of the CorrXP and binds the DemXP, since it cannot be done locally. I am aware that my analysis cannot directly be transferred onto this example either, since it would be a bit implausible to assume that in this scenario, too, the DemXP moves out of the relative clause and on top of the correlative. But what exactly moves or can be moved in a correlative construction may very well be subject to crosslinguistic variation. In the case of Lhasa, it seems more plausible to move the RelXP at LF, but the mechanism in and of itself is still usable.

## 7 Conclusion

The goal of this paper was to analyze Hindi/Urdu multi-head correlatives as a variant of Voldemort phrases. This seems to be a promising route, since it straightforwardly predicts many of the quirks specific to these constructions, like the unexpected NPI licensing pattern and them seemingly displaying island effects even though the correlative does not move. This is done without positing any machinery specific to the problem. The analysis aims at explaining multi-head correlatives, but can be used for single-head correlatives as well, as shown independently by Beshears (2016). The analysis presented therein differs slightly from the one presented here, but since more or less the same machinery is used, I would consider these approaches equivalent. Future research is as usual needed. Voldemort phrases or their translations behave very differently across languages as shown in Zobel (2015). One would assume that correlatives or correlative-like structures in these languages show corresponding behavior.

- (41) He who wears a tie annoys his colleagues (unique/universal)  
 He who wears any tie annoys his colleagues (universal only)

These sentences are as expected. Compare them with these German (or to be specific: Swabian) translations:

- (42) Wer immer mit Krawatte rumrennt (der) nervt seine Kollegen. (universal only)  
 Who always with tie around.runs (he) annoys his colleagues  
 (43) Der wo immer mit Krawatte rumrennt (der) nervt seine Kollegen. (unique/universal)  
 He where always with tie around.runs (he) annoys his colleagues  
 (44) Wer jemals mit Krawatte rumgerannt ist nervt seine Kollegen. (universal only)  
 Who ever with tie around.run.Pfv be annoys his colleagues  
 (45) \*Der wo jemals mit Krawatte rumgerannt ist nervt seine Kollegen. (unique/universal)  
 He where ever with tie around.run.Pfv be annoys his colleagues

Examples like these might provide additional insight into the problem and allow us to see the connection between these phenomena a bit clearer.

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# Reevaluating Standard Analyses of Comparison: The View from Malayalam

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## ABSTRACT

In this paper, I will argue for an alternative analysis where both the standard marker *than* and the comparative marker *more* encode comparative semantics. The evidence for this comes from Malayalam comparatives. Malayalam lacks an adjectival category and uses complex property concept expressions to encode adjectival meaning (Menon 2013, Menon and Pancheva forthcoming). In the absence of adjectives, nominal and verbal comparatives are formed using two different kinds of comparatives. The comparative marker is an adnominal degree modifier along the lines of ‘in addition to’, ‘in excess of’. The comparative semantics is encoded in the semantically non-vacuous *than* which functions as a quantifier domain adverbial (similar in spirit to Schwarzschild 2014) whereby it restricts the domain of the degree quantifier *more*.

## 1. Introduction

Under the standard analysis, gradable adjectives denote relations between individuals and degrees (Seuren 1973, Cresswell 1979 a.o). A gradable predicate, such as *tall*, incorporates the measure function *height*, which when applied to an individual, yields the degree *d* of *height* of that individual.

$$(1) \quad \llbracket \text{tall} \rrbracket = \lambda d \lambda x. \mathbf{height}(x) \geq d$$

In the degree analysis of adjectives, functional morphology such as, measure phrases (‘two feet’), positive morphemes (POS), or the comparative morpheme *more* saturate the degree argument. In comparatives, such as (2) the semantics of comparison is encoded in the comparative morpheme (3) and the standard marker *than* is taken to be semantically vacuous. The degree morpheme is a quantifier that undergoes quantifier raising along with the standard phrase.

- (2) a. John is taller than Bill (is).  
b. John is [<sub>AP</sub>[<sub>DegP</sub> -er than Bill] tall]  
c. [<sub>DegP</sub> -er than Bill]<sub>i</sub> John is [<sub>AP</sub> t<sub>i</sub> tall]

$$(3) \quad \llbracket \text{-er/more} \rrbracket = \lambda D. \lambda D'. \max D' > \max D \quad (\text{Heim 2000})$$

In the absence of lexical adjectives, Malayalam uses property concept expressions (often lexicalized as adjectives in languages that have them). The semantics of these expressions differ considerably from the standard semantics. This paper extends the semantics to understand how comparison works in languages without lexical adjectives.

## 2. Malayalam comparatives: The basic data

There are two types of comparatives in Malayalam, depending on the standard marker: *kaal-um* and *il-um* (4). They both show clausal comparison and phrasal comparison (see Menon 2012 for some diagnostics). The *kaal-um* is similar to a particle comparative and is unique to Malayalam among other Dravidian languages. *kaal* is a dedicated *than* morpheme found only in comparatives. The comparative marker *kuuttal* is optional with *kaal-um* comparatives.

- (4) a. the *kaal-um* comparative: phrasal  
Anil-inə [*Komalan-e kaal-um*] (kuuttal) pokkam unʃə  
Anil-DAT Komalan-ACC than-UM more tallness POSS V  
‘Anil is taller than Komalan.’ (Lit. ‘To Anil there is (more) tallness than Komalan.’)

- b. the *kaal-um* comparative: clausal

Anil-inə [Komalanə pokkam u][a-t-ine] kaa]-um (kuuṭuttal)  
 Anil-DAT Komalan-DAT tallness EX.COP<sub>nonfinite</sub>-REL-NOML-ACC than-UM more  
 pokkam uṅṅə  
 tallness POSS V  
 ‘Anil is taller than Komalan.’ (Lit. ‘To Anil there is (more) tallness than Komalan has tallness.’)

The second type of comparison, called the *il-um* comparative is the common strategy employed by all other Dravidian languages. It uses a locative postposition *il*, which is attached directly to the standard. Thus, there is a case marking difference between the two comparatives. The standard in the *kaa]-um* comparative is accusative case marked while the standard in the *il-um* comparative is locative case marked.

(5) a. the *il-um* comparative: phrasal

Anil-inə [Komalan-il-um] \*(kuuṭuttal) pokkam uṅṅə  
 Anil-DAT Komalan-LOC-UM more tallness POSS V  
 ‘Anil is taller than Komalan.’ (Lit. ‘To Anil from Komalan there is tallness.’)

b. the *il-um* comparative: clausal

Anil-inə [Komalanə pokkam u][a-t-il-um] \*(kuuṭuttal)  
 Anil-DAT Komalan-DAT tallness EX.COP<sub>nonfinite</sub>-REL-NOML-LOC-UM more  
 pokkam uṅṅə  
 tallness POSS V  
 ‘Anil is taller than Komalan.’ (Lit. ‘To Anil from Komalan there is tallness.’)

There are two generalizations from the above data. The comparative marker behaves differently in *kaa]-um* and *il-um* comparatives. In the case of *il-um* comparatives, the comparative marker *kuuṭuttal* is obligatory.

### 3. Distribution of the comparative marker *more*

The comparative marker in Malayalam *kuuṭuttal* has a peculiar distribution. Depending on different expressions it can combine with, there is an asymmetry in the distribution.

#### 3.1. NP comparatives are conditioned by possession

The comparative marker is obligatory when the NP is encoded in a non-possessive construction. When the NP is encoded in a possessive construction (the existential copula), the comparative marker is optional.

(6) NP comparative: obligatory *more* outside of possession

- a. Anil [Komalan-e kaa]-um] \*(kuuṭuttal) pazham kazhicc-u  
 Anil Komalan-ACC than-UM more bananaseat-PAST  
 ‘Anil ate more bananas than Komalan.’  
 b. \*(kuuṭuttal) vellam kuṭiccu ‘drank more water’  
 c. \*(kuuṭuttal) kaatu vizhingi ‘ate more air’

(7) NP comparative: optional *more* with possession

- a. Anil-inə [Komalan-e kaa]-um] (kuuṭuttal) vellam uṅṅə  
 Anil-DAT Komalan-ACC than-UM more water POSS V  
 ‘Anil has more water than Komalan.’  
 b. (kuuṭuttal) paṅam uṅṅə ‘has more money’

Crucially, possession plays a role in determining the presence of the comparative marker. In the case of *il-um* comparative, as I noted in the previous section, the comparative marker is always obligatory.

### 3.2. Verbal comparatives: obligatory more

In the case of verbal comparatives, the comparative marker seems to be obligatorily required.

- (8) a. Anil [*Komalan-e* kaa[-um] \*(kuuṭṭal) ooti  
 Anil Komalan-ACC than-UM more ran  
 ‘Anil ran more than Komalan.  
 b. \*(kuuṭṭal) nadannu ‘walked more’  
 c. \*(kuuṭṭal) mala kerī ‘climbed more hills’

The same obligatory requirement holds of verbal comparatives formed using the *il-um* comparative.

### 3.3. Class 1 property concept expressions prohibit the comparative marker

In previous work, I have analyzed Malayalam has having two classes of property concept (PC) expressions (for more details, see Menon 2013, Menon and Pancheva 2014, Menon and Pancheva forthcoming). There are no semantic differences between the two types of roots. The distinction is morpho-syntactic (based on etymology), and the morpho-syntactic class determines the type of structures the roots can appear in.

- (9) a. [[ √nall ]] = the property of goodness (Class 1)  
 b. [[ √santosh ]] = the property of happiness (Class 2)

A covert possessive *v* categorizes Class 1 roots. Class 2 roots are categorized with a non possessive *v*, and they enter further PC predication as complements of possessive predicates. Correspondingly, all PC predication is possession-based.

#### (10) Class 1 PC root (-a ending, relativized root)

- a. [[[√nall +  $\varnothing_{v\_poss}$  ]<sub>v</sub> + POS]<sub>v</sub> -a]<sub>rel</sub>  
 Lit. ‘having an instance of goodness measuring to a degree that exceeds the standard’  
 b. [[ $\varnothing_{v\_poss}$ ]] =  $\lambda II \lambda d \lambda x \exists y [y \text{ is an instance of } II \ \& \ x \text{ has } y \ \& \ \mu(y) \geq d]$   
 c. [[ POS ]] =  $\lambda g_{<d, <e, t>}. \lambda x. \exists d [g(d)(x) \ \& \ d > d_s]$   
 d. [[nalla]] =  $\lambda x. \exists d \exists y [y \text{ is an instance of goodness} \ \& \ x \text{ has } y \ \& \ \mu(y) \geq d \ \& \ d > d_s]$   
 $\approx \lambda x. \exists d [x\text{'s goodness} \geq d \ \& \ d > d_s]$

Thus, Class 1 PC expressions encode covert possession and they are gradable. These Class 1 PC expressions such as *big*, *good*, *new* never appear with the comparative marker.

#### (11) Class1 PC comparatives: *more* is prohibited

- a. Anil [*Komalan-e* kaa[-um] (\*kuuṭṭal) nalla-van aaṇṇ  
 Anil Komalan-ACC than-UM more good-M.SG PRED V  
 ‘Anil is good than Komalan.’ (Lit. ‘Anil is one having goodness than Komalan’)  
 b. (\*kuuṭṭal) pazhayatə ‘more old’  
 c. (\*kuuṭṭal) valippam ‘more big’

Class 1 PC expressions only appear with *kaa[-um]* comparative due to the prohibition against the comparative marker.

### 3.4. Class 2 property concept expressions optionally allow the comparative marker

Class 2 PC roots are non-gradable and they are categorized using a non possessive verbal head.

#### (12) Class 2 property concept root (-am ending, nominalized root)

- a.  $[[\sqrt{\text{pokk}} + \varnothing_v]_v + \text{-am}]_n$   
Lit. ‘being an instance of height’
- b.  $[[\varnothing_v]] = \lambda I I \lambda x [x \text{ is an instance of } I]$
- c.  $[[\text{pokkam}]] = \lambda x. [x \text{ is an instance of height}]$

The possessive relation is expressed at the level of the word, through a covert possessive verbal morpheme, with Class 1 roots, and at the phrasal level, through an overt possessive verb, with Class 2 roots. Gradability is directly related to property possession. Only Class 1 roots are gradable.

Class 2 PC expressions such as *happiness*, *tallness*, *smartness* optionally appears with the comparative marker.

(13) Class 2 PC comparatives: *more* is optional

- a. Anil-inə            [Komalan-e    kaa[-um]            (kuuṭuttal)    pokkam    unṭə  
Anil-DAT           Komalan-ACC    than-UM            more            tallness    POSS V  
‘Anil is taller than Komalan.’ (Lit. ‘Anil has more tallness than Komalan.’)
- b. (kuuṭuttal) santosham            ‘more happiness’
- c. (kuuṭuttal) dukkam                ‘more sadness’

A question regarding the comparative marker emerges at this point. Why is *more* obligatory with NP comparatives outside of possession, optional with possessive predicates including those appearing with Class 2 expressions, and disallowed with Class 1 expressions? The answer lies rooted in the semantics of the standard marker, often assumed semantically vacuous in standard analyses as we will see in Section 5.

In this section, we have seen that the behavior of *more* is quite distinct from the English *-er/more*. It has a varied distribution depending on the standard marker and the kind of expression it combines with. The next section examines the distribution of the standard marker *than*.

#### 4. Distribution of *than*

It is well known that in English, the standard phrase in a comparative construction can be optionally omitted. These type of constructions are called as implicit comparatives.

(14) {Come out onto the porch.} It’s cooler here. (Sheldon 1945)

- (15) a. John has 3 pens. I have more.
- b. John is 6 ft tall. I am taller.

##### 4.1. *Than* is always obligatory in Malayalam

Unlike English comparatives, the standard marker in Malayalam comparatives can never be omitted and these comparatives are disallowed.

- (16) a. Anil-inə            muunə    pena    unṭə.    enikkə [atin-e    kaa[um]    kuuṭuttal    unṭə.  
Anil-DAT            three    pens    EX COP    I-DAT    that-ACC    than    more            POSS V  
‘Anil has three pens. I have more than that.’
- b. Anil-inə            aarə    aṭi    pokkamunṭə.    enikkə [atin-e    kaa[um]    kuuṭuttal    unṭə  
Anil-DAT            three    feet    tallness EX COP    I-DAT    that-ACC    than    more    POSSV  
‘Anil is 6 feet tall. I have more than that.’

Thus, another generalization that comes forth from this data is regarding the nature of the comparative marker *more* in Malayalam, it behaves differently from English *more*. Schwarzschild 2014, analyses Hebrew as having a semantically meaningful *than*, based on the way the language forms differentials.

Malayalam differs from English and Hebrew in forming comparatives from property concept expressions. Hebrew and Malayalam allow bare comparatives, formed only using the standard phrase headed by *than*. English and Hebrew, to the exclusion of Malayalam, allow an incomplete comparative where the standard phrase is omitted. Thus, the Malayalam *than* is special and the behavior of *than* and *more* in Malayalam is different from that of English or Hebrew.

## 5. Toward an analysis

There are three viable options for accounting for the variable behavior of the comparative marker. I will show that only one of these options is tenable for the data presented from the Malayalam comparatives. The first option is to assume the standard semantics for the comparative marker as in the standard literature. In this case, the comparative marker *more* encodes the comparative semantics. However, this analysis will provide no explanation for the varied distribution of the comparative marker. Why is it that the *more* is disallowed with Class 1 property concept expressions, optional with Class 2 property concept expressions, and obligatory with NP and VP comparatives, if indeed the comparative marker encodes comparative semantics uniformly?

The second option is to assume a silent degree head as is seen postulated for Hindi (Bhatt and Takahashi 2011). However, if indeed there was a silent head mediating the semantics, we expect to see systematic distinctions between the degree head *-er* and the comparative marker, yet we don't.

The final option is to assume that the standard phrase is not semantically vacuous and in addition to the comparative marker encodes the comparative marker. This is the analysis I will be pursuing in the following sections.

### 5.1. Is the *more* actually *more*?

Before laying out the analysis, looking at the nature of the comparative marker, one could ask whether it is indeed a comparative marker. I will offer a morphological decomposition account suggesting that the comparative marker is a dedicated morpheme seen only in comparative uses.

$\sqrt{\text{kur}}$  is the root for quantity predicates. The same root can be seen in comparatives of superiority (*more*) as well as comparatives of inferiority (*less*). Moreover, *kuuṭuttal* 'more' is only used in comparatives.

- |      |    |   |                           |
|------|----|---|---------------------------|
| (17) | a. | $\sqrt{\text{kur}} + \text{-ee} = \text{kuree}$                 | 'a lot, many, much'       |
|      | b. | $\sqrt{\text{kur}} + \text{-avə} = \text{kuravə}$               | 'less'                    |
|      | c. | $\sqrt{\text{kur}} + \text{-uka} = \text{kuuṭuka}$              | 'to increase'             |
|      | d. | $\sqrt{\text{kur}} + \text{uṭ} + \text{-al} = \text{kuuṭuttal}$ | 'many/much + er' ~ 'more' |

### 5.2. A semantics for *than*

It is not altogether implausible to assume a semantics for the standard marker. Cross-linguistically, it has been shown that the standard marker determines the semantics of comparison by selecting for a phrasal vs. clausal standard of comparison (Kennedy 2009). As seen in Schwarzschild 2014 for Hebrew and earlier in this paper in Section 3, comparative marker is not always necessary in comparative constructions. Comparative markers are also cross-linguistically rarer than standard markers (Stassen 1985).

### 5.3. *Than* is not semantically vacuous and encodes comparison<sup>1</sup>

My main proposal is regarding the semantic content of the standard marker *than*. The semantics for the standard marker is given in (18). It takes two individuals and gives an ordering between the property possessed by the individual *x* and the property possessed by the individual *y*. Thus, the standard marker establishes an ordering relation and also compares the property possession. However, there needs to be a notion of maximality, which is given by the characteristic function supremum *sup*. This function gives the

<sup>1</sup> This analysis supersedes the analysis in Menon (forthcoming).

least upper bound reading. The *sup* function is adapted from Alrenga et al (2013). *Π* is a meta variable on property concept expressions.

$$(18) \quad \text{than:} \quad \llbracket \text{kaa}\{-um\} \rrbracket = \lambda P_{\langle e, t \rangle}. \lambda y. \exists \Pi [ \text{sup } \Pi (y) > \text{sup } \Pi (P) ]$$

*Than* first takes the standard clause as its argument and relates the target of comparison with the standard of comparison. One evidence pertaining to the claim that the standard marker is not a degree quantifier comes from the inability of the *than* phrase to host a degree denoting expression such as a measure phrase or degree descriptions such as ‘more than three’.

$$(19) \quad \text{a.} \quad \begin{array}{llllll} * \text{Anilin}\bar{a} & \text{aar}\bar{a} & \text{a}\bar{t}\bar{i}\text{-e} & \text{kaa}\{\text{um}\} & \text{pokkam} & \text{u}\bar{n}\bar{t}\bar{a} \\ \text{Anil-DAT} & \text{six} & \text{feet-ACC} & \text{than} & \text{tallness} & \text{EX COP} \end{array}$$

‘Anil is more than 6 feet tall.’

$$\text{b.} \quad \begin{array}{lllll} \text{Anilin}\bar{a} & \text{aar}\bar{a} & \text{a}\bar{t}\bar{i}\text{-il-um} & \text{pokkam} & \text{u}\bar{n}\bar{t}\bar{a} \\ \text{Anil-DAT} & \text{six} & \text{feet-LOC-UM} & \text{tallness} & \text{EX COP} \end{array}$$

‘Anil is more than 6 feet tall.’

$$(20) \quad \text{a.} \quad \begin{array}{llllll} * \text{Anilin}\bar{a} & \text{muun-ine} & \text{kaa}\{\text{um}\} & \text{kuu}\bar{t}\bar{t}\bar{a} & \text{pustakam} & \text{u}\bar{n}\bar{t}\bar{a} \\ \text{Anil-dat} & \text{six-DAT} & \text{than} & \text{more} & \text{books} & \text{EX COP} \end{array}$$

‘Anil has more than three books.’

Given this semantics, in the next sections I develop how comparatives are formed in the different classes of property concept expressions in Malayalam.

#### 5.4. *Than* alone encodes comparison- Class 1

Class 1 property concept expressions are *-a* ending relativized property concept expressions and they never allow an overt comparative marker *more*. The internal composition of these Class 1 expressions encode covert possession, through merge in the Spec of a functional head  $\varnothing_{v\_poss}$ . The positive morpheme (POS) can saturate the degree argument and the *-a*, which is the relative clause marker in Proto-Dravidian attaches next. The role of this marker is only syntactic and it does not change the semantic type of the property concept expression.

$$(21) \quad \llbracket [ [ \sqrt{\text{null}} + \varnothing_{v\_poss} ]_v + \text{POS} ]_v -a ]_{\text{rel}} \rrbracket$$

Lit. ‘having an instance of goodness measuring to a degree that exceeds the standard’

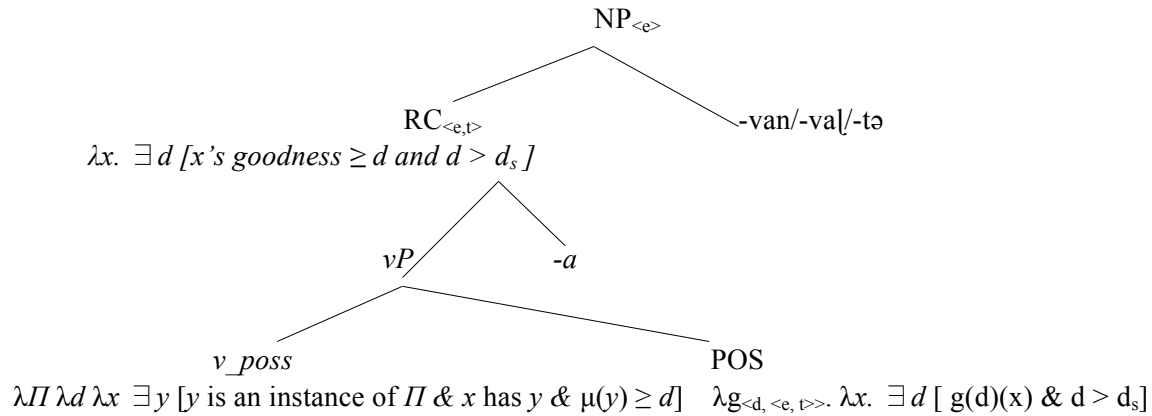
$$(22) \quad \text{a.} \quad \begin{array}{c} \text{RC} \\ \lambda x. \exists d [ x\text{'s goodness} \geq d \text{ and } d > d_s ] \\ \swarrow \quad \searrow \\ \text{vP} \quad \quad \quad -a \\ \swarrow \quad \searrow \\ \text{v\_poss} \quad \quad \quad \text{POS} \end{array}$$

$$\lambda \Pi \lambda d \lambda x \exists y [ y \text{ is an instance of } \Pi \ \& \ x \text{ has } y \ \& \ \mu(y) \geq d ] \quad \lambda g_{\langle d, \langle e, t \rangle \rangle}. \lambda x. \exists d [ g(d)(x) \ \& \ d > d_s ]$$

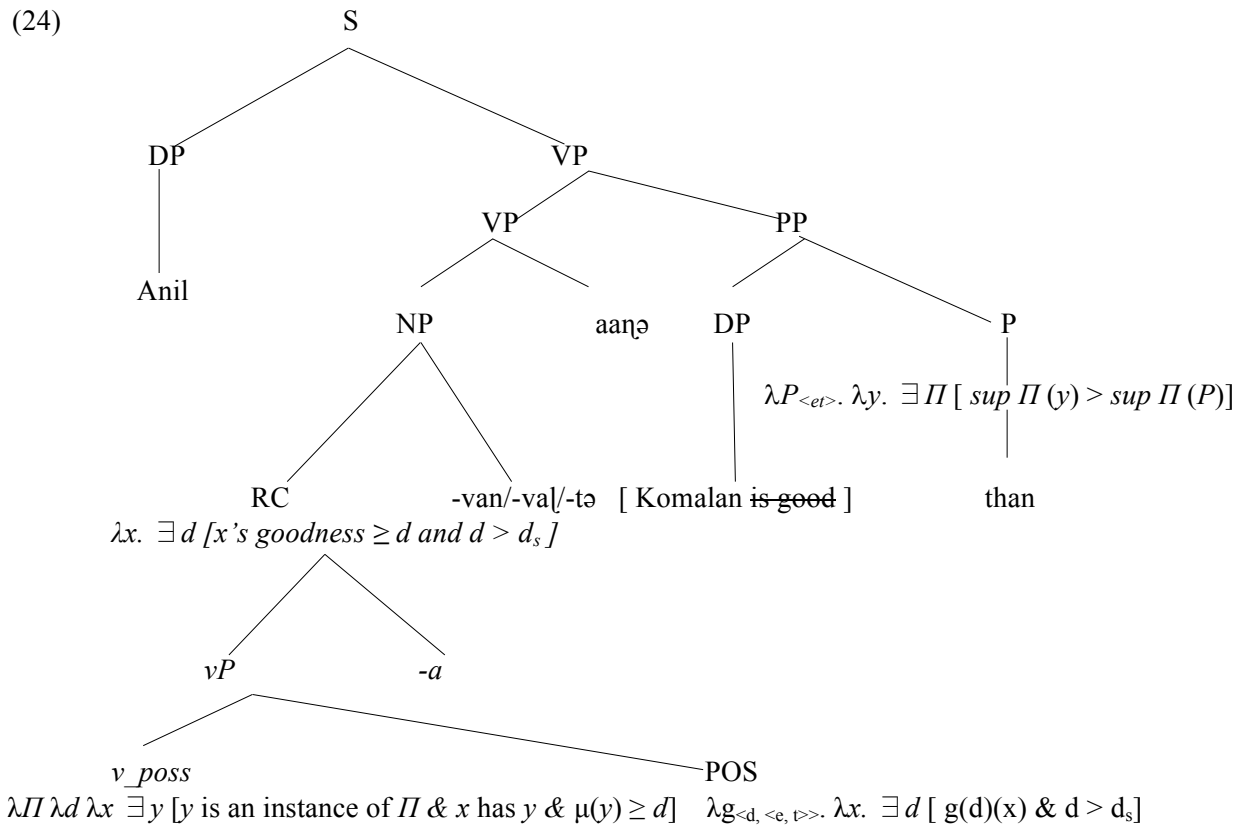
The role of the standard marker, *than*, which is a PP adjunct that can adjoin to the vP, is to combine with a Class 1 expression and restrict the POS, essentially set the context. It also introduces an ordering relation

between the property possessions. This structure is then turned into a resumptive one by the addition of resumptive pronouns that turn the relative clause into a free relative.

(23) b. A pronoun makes the relative clause in (22a) into a free relative.



The PP adjunct is then right adjoined to the VP. I will assume that comparative clause is unpronounced following VP ellipsis at the PF interface. The reason for assuming a clausal standard and not a phrasal standard is due to the fact that the clause can be pronounced fully, optionally (cf. (4b)).



The PP adjunct then obligatorily extraposes to the left of the VP to derive the correct word order, as in the classical analysis of comparative syntax (Bresnan 1973). Comparative semantics is entirely encoded in

*than*. Syntactically as well as semantically the comparative marker has no role. Thus in some sense, this is similar to an implicit comparison (compared to) in English, although the *kaaʃum* comparative is an explicit comparative.

(25) Compared to John, Bill is tall.

This analysis also accounts for how the distribution of *kaaʃum* is less restricted than that of *than* phrases. The comparative marker cannot appear on its own since its role is to introduce a measure function.

(26) a. \*Than John, I love Paris.

b. Anil-ine      **kaaʃum**              enikkə Paris    iʃtam    aaŋə  
 Anil-DAT    than                              I-DAT Paris    love    PRED V  
 ‘I love Paris than Anil.’

c. Anil-ine      **kaaʃum**              Komalanə      pustakam      uŋtə  
 Anil-DAT    than                              Komalan-DAT books              EX.COP  
 ‘Komalan has more books than Anil.’

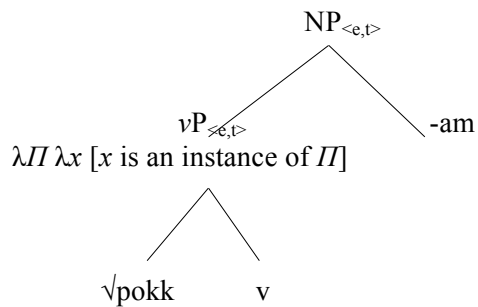
In Class 1 property concept expressions, the comparative semantics is wholly achieved by the semantics of the standard marker.

#### 4.7.3.3. *Than alone encodes comparison- Class 2*

Class 2 property concept expressions are different from Class 1 property concept expressions in that they are nominalized with the *-am* marker. They merge in the Spec of a non possessive  $\emptyset_v$ . Thus in these cases, the possession is encoded overtly by combining with the possessive verb *uŋtə*. The possessive verb together contributes a degree for comparison. This verb also mandatorily requires dative marking.

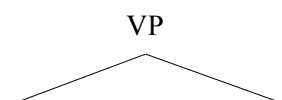
(27)  $[[\sqrt{\text{pokk}} + \emptyset_v]_v + \text{-am}]_n$   
 Lit. ‘being an instance of height’

(28)



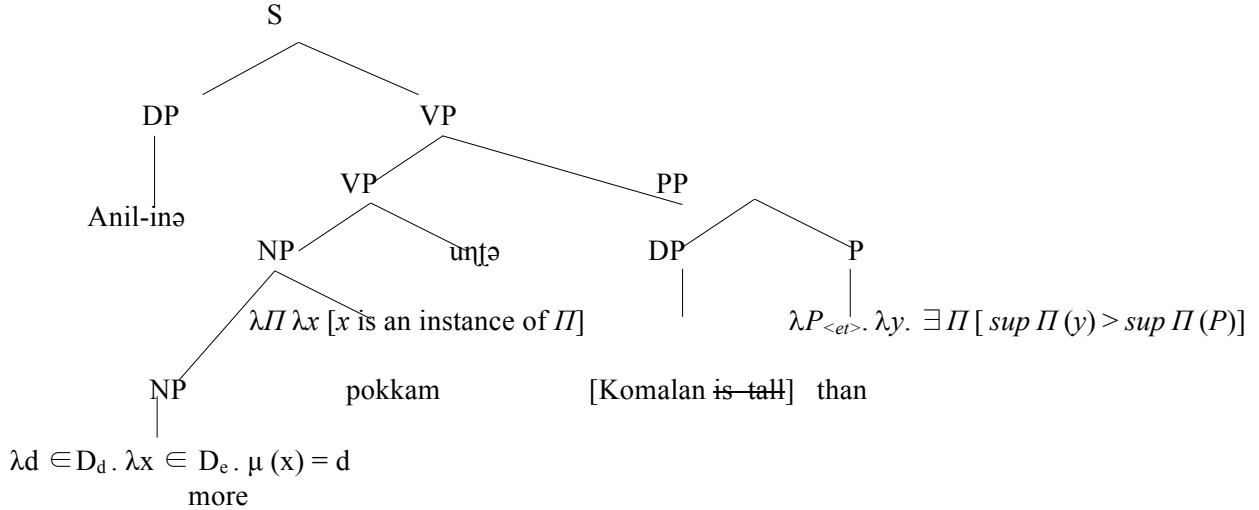
The nominal formed in (28) merges with a vP hosting the Poss V. Thus possession makes the predicate gradable. The standard marker *than* saturates the degree argument of the have predicate + dative construction.

(29)









Thus, NP and VP comparatives need to be made gradable overtly by the addition of the degree morphology, the comparative adnominal marker *more* which introduces the measure function.

## 6. Conclusion

We have seen there is a maximally transparent mapping from surface syntax to meaning by showing that both the comparative morpheme (*more*) and the standard morpheme (*than*) contribute to the semantics of comparison. The *than* can never be omitted from comparative constructions. The *than* phrase can bind the degree argument in the matrix clause in bare comparatives or can act as a quantifier domain adverbial in the presence of *more*. This division of labor can be seen in other instances of grammar, time and tense adverbials, modality and negation, numerals and plurals.

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# A temporal semantics for Malayalam Conjunctive Participle Constructions

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## ABSTRACT

This paper asks how the semantics of Conjunctive Participle Constructions are obtained in Malayalam. After providing an overview of the syntactic and pragmatic factors governing the use of this construction, the paper points out the similarity of this Malayalam construction to the English absolute construction. It suggests that an account like Stump (1985) might be able to account for the Malayalam data. The main conclusion of the paper is that Malayalam Conjunctive Participle Constructions are semantically underspecified for tense and aspect and also probably structurally small.

## 1 Introducing the puzzle

This paper focuses on the question of how Malayalam Conjunctive/Adverbial Participle Constructions/Serial Verb Constructions (my ‘multi-verb constructions’) get their temporal semantics. Examples (1)-(3) show why the answer to this question is not obvious. In (1) the *-u/i* morpheme looks like the past tense marker on the main verb (boxed).

(1) a. (innale) njaan pazhum kazhicch-u.  
Yesterday I banana take-PST  
‘I ate a banana (yesterday).’

b. (innale) njaan palli-yil pooy-i.  
Yesterday I church-LOC go-PST  
‘I went to church (yesterday).’

In sentences like (2b-c) the *-u/i* in Conjunctive/Adverbial Participles (what I will call ‘non-main’ verbs and mark with a dotted underline) does not seem to encode past semantics. These sentences, respectively, receive a present and future interpretation, despite the fact that the non-main verb has the *-u/i* marker. This suggests that the *-u/i* marker is, in fact, not a past tense marker. At this point, one might think, as Amritavalli & Jayaseelan (2005) have done, that the *-u/i* is a perfective marker, since non-main event precedes the main event in the sentences in (2).

(2) a. vasantha peena kada-yil pooy-i vaang-i.  
Vasantha pen shop-LOC go-U/I buy-PST  
‘Vasantha went to the shop and bought a pen.’ (Gopalkrishnan 1985 p71: 68a)

b. vasantha peena kada-yil pooy-i vaang-unnu-Ø.  
Vasantha pen shop-LOC go-U/I buy- IMPFV-PRS  
‘Vasantha goes to the shop and buys (is going to the shop and buying) a pen.’

c. vasantha peena kada-yil pooy-i vaang-um.  
Vasantha pen shop-LOC go-U/I buy- FUT  
‘Vasantha will go to the shop and buy a pen.’

However, as Hany Babu & Madhavan (2003) have pointed out, when sentences like (3) are added to the data set, a perfective analysis of *-u/i* becomes unlikely. In (3) the main verb is in the present tense and the events denoted by the *-u/i* marked non-main verbs occur simultaneously with the event denoted by the main verb.

- (3) avan padicch-u padippicch-u jooli cheyth-u jeevikk-unnu-Ø  
 he study-U/I teach- U/I job do-U/I live-IPFV-PRS  
 ‘He lives studying, teaching and working.’

The name Conjunctive/Adverbial Participle comes from the two ways these constructions can be translated, either as participle adjuncts serving an adverbial type function, (3), or as conjoined sentences, (2). While they are sometimes translated using conjunction, they are different than ‘genuinely’ coordinated sentences in the language. These require the conjunctive particle, *-um*, (4a), which is does not appear in most Conjunctive/Adverbial Participle Constructions. In a sentence using *-um* coordination, the light verb *cheyyuka* ‘do’ and non-finite form *-uka* are required because finite clauses cannot be coordinated in Malayalam by simply adding *-um* to each verb, (4b).

- (4) a. raaman var-uka-yum Krishnan pook-uka-yum cheyth-u  
 Raman come-INF-CONJ Krishnan go-INF-CONJ do-PST  
 ‘Raman came and Krishnan went.’ (Asher & Kumari 1997 p135: 647c)
- b. \*raaman vann-u-yum krishnan pooy-i-yum  
 Raman come-PST-CONJ Krishnan go-PST-CONJ  
 ‘Raman came and Krishnan went.’

I assume that languages have formal, abstract morphosyntactic features, which are used by the interpretive component to assign the proper semantics to a string and are located in the corresponding functional projections. The correspondence between morphemes and features in Malayalam that I assume is given in (5).<sup>1</sup>

- |   |                                  |
|---|----------------------------------|
| (5) <i>-unnu</i> : [IMPFV]                          | -Ø: [PRES]                       |
|   | <i>-u/i</i> (main-verbs): [PAST] |
|   | <i>-um</i> [FUT-MOD]             |
| <i>-u/i</i> (non-main verbs): no feature associated |                                  |

This leads us to a refined version of our focus question: If the *-u/i* in non-main verbs does not have any features associated with it, how are the temporal semantics of multi-verb constructions obtained? This question will guide the rest of the paper. In section 2, I highlight the similarities between English absolutes and Malayalam multi-verb constructions. In section 3, I suggest that an adapted version of Stump’s (1985) analysis might be a way to account for the Malayalam data. Section 4 concludes the paper.

## 2 The syntactic and pragmatic properties of multi-verb constructions

Let us begin with a brief overview of the syntactic properties of multi-verb constructions. Previous work has identified non-main verbs as being non-finite (Jayaseelan 1984, 2003; Amritavalli & Jayaseelan 2005; Hany Babu & Madhavan 2003, Gopalkrishnan 1985), IP or AspP sized adjuncts (Jayaseelan 2003). Evidence that non-main clauses are at least as big as vPs comes from the fact that they can have separate subjects, (5). Multi-verb constructions can have different, (1), or same objects, (9b).

- (6) [paampu kadicch-u] goopi maricch-u

<sup>1</sup> See Swenson (in preparation) for more details justifying these assumptions.

snake bite-U/I Goopi die-PST  
 ‘The snake bit (Gopi) and Gopi died.’ (Gopalkrishnan 1985 p55: 41)

The fact that no tense or viewpoint aspect morphemes<sup>2</sup> can be added to non-main verbs suggests that they may be even smaller than AspP. Example (7) shows that multi-verb constructions can appear in a variety of places in the sentence, just like the adjuncts in their English translations.<sup>3</sup>

- (7) a. njaan school-ilekku nadann-u [apple kazhicch-u].  
 I school-to walk-PST apple take-U/I  
 ‘I walked to school, eating an apple.’  
 [school must be reached; apple does not have to be eaten (though it could be)]
- b. njaan [apple kazhicch-u] school-ilekku nadann-u.  
 I apple take-U/I school-to walk-PST  
 ‘I walked, eating an apple, to school.’  
 [school must be reached; apple does not have to be eaten (though it could be)]
- c. [apple kazhicch-u] njaan school-ilekku nadann-u.  
 apple take-U/I I school-to walk-PST  
 ‘Eating and apple, I walked to school.’  
 [school must be reached; apple does not have to be eaten (though it could be)]

Also like their English absolute counterparts, Malayalam multi-verb constructions require pragmatic licensing conditions. According to Gopalkrishnan (1985), multi-verb constructions presuppose that the non-main verb is linked to the main verbs via one of the relationships demonstrated in (8): manner adverbial, (a), sequential part of a larger action, (b), cause and resulting effect, (c), and means used and ends achieved, (d).

<sup>2</sup> Examples like (3) argue that *-u/i* is not a perfective marker itself. The forms *-ittu* and *-kondu*, which can be added to multi-verb constructions, and which Asher & Kumari (1997) have called perfective and progressive markers, respectively seem to more accurately be telicity markers: *-ittu* signals that the telos has been reached while *-kondu* signals that it has not been reached.

- (i) a. raadha sinimu-kku pooy-**irikk-uka.yaanu**  
 Radha cinema-DAT go-U/I-irikk-PROG.PRS  
 ‘Radha has gone for a film.’ (Gopalkrishnan 1985 p237: 19)  
 [she could be on her way now or sitting in the theater, we don’t know]
- b. raadha sinimu-kku pooy-i-**kond-irikk-uka.yaanu**  
 Radha cinema-DAT go-U/I-kond-irikk-PROG.PRS  
 ‘Radha has gone for a film.’  
 [she is on her way now *but hasn’t reached the theater*]

<sup>3</sup> We can be sure what is the non-main vs. main verb here because in non-main forms ending in *-u*, the *-u* is reduced to a schwa in spoken Malayalam and written with the schwa marker, *̣*, while the *-u* in past tense main verbs is pronounced as *-u* and written with the *-u* marker, *u*. The *-i*, however, is pronounced as *-i* and written the *i* marker, *i*, in both environments.

- (8) a. mani avan-te katha karanj-u paranj-u.  
 Mani he-GEN tale cry-U/I tell-PST  
 ‘Weeping, Mani told his tale.’
- b. shaantha kanji vecch-u kudicch-u.  
 Shantha rice.porridge make-U/I drink-PST  
 ‘Shantha made rice porridge and drank it.’
- c. kathaku thurakunna shabdham keett-u annamma unarnn-u.  
 door opening noise hear-U/I Annamma wake.up-PST  
 ‘Annamma woke up on hearing the sound of the door being opened.’
- d. enikku maranju kudicch-u asukham maar-i.  
 I.DAT medicine drink-U/I illness move-PST  
 ‘I took the medicine and got well.’  
 (Gopalkrishnan 1985 p18: 8, p52: 37a, p17: 3-4)

When such a relationship is lacking, she claims that the sentence becomes bad, (9a). Instead to link these two sentences, *-um* coordination is required, (9b).

- (9) a. #giita pachakkari arinj-u chaaya und-aakk-i.  
 Gita vegetables chop-U/I tea exist-CAUS-PST  
 ‘Gita chopped vegetables and made tea.’ [doesn’t meet criteria]  
 (Gopalkrishnan 1985 p32: 18)
- b. giita [pachakkari ariy-uka-yum] [chaaya und-aakk-uka-yum] cheyth-u  
 Gita vegetables chop-INF-CONJ tea exist-CAUS-INF-CONJ do-PST  
 ‘Gita chopped vegetables and made tea.’

However, if (9a) is put into the right context, it becomes fine for at least some speakers.

- (10) Context: A line in a suspense novel. Gita is a family servant. Her job is to chop the vegetables. After finishing her work, she always makes herself a glass of tea before going.

ella divasathe poleyum giita pachakkari arinj-u chaaya  
 every day other Gita vegetables chop-U/I tea  
und-aakk-i. udane, urakkeyulla shabdham keett-u.  
 exist-CAUS-PST suddenly loud noise hear-PST  
 ‘Just like any other day, Gita chopped the vegetables and made tea. Suddenly, she heard a loud noise.’

Another way in which we can see pragmatic licensing is in a constraint on when different subjects are allowed in main and non-main clauses. According to Gopalkrishnan (1985), different subjects are generally disallowed, except, as in (6), where the subject of the main clause is an argument in the non-main clause.

- (11) a. **shaantha** kanji      vecch-u kudicch-u  
 Shantha rice.porridge make-U/I drink-PST  
 ‘Shantha made rice porridge and drank it.’
- b. #[**shaantha** kanji      vecch-u] **njaan** kudicch-u  
 Shantha rice.porridge make-U/I I drink-PST  
 ‘Shantha made rice porridge, and I drank it.’ (Gopalkrishnan 1985 p52: 37)

However, according to my fieldwork, for at least some speakers, (11b) is fine in a context where I am sick and Shantha is taking care of me and thus makes kanji for me. It is also ok if I visit Shantha’s house and I drink kanji because she made it especially for me or if Shantha brought kanji to the office especially for me, so I should eat it. The generalization here seems to be that different subjects are allowed only when some type of a connection can be established between the main and non-main clauses.

Another place where the pragmatic restrictions can be seen is in reduplication. Example (12) shows that Conjunctive Participle forms can be reduplicated for emphasis.

- (12)      mani chuttum nook-i nook-i nadunn-u.  
 Mani around look-U/I look-U/I walk-PST  
 ‘Mani walked, looking around’ (intensive)  
 [lit. Mani walked around looking, looking] (Gopalkrishnan 1985 p95: 107b)

Gopalkrishnan (1985) claims that in certain contexts reduplication is not possible due to semantic constrains, (13b). This is probably due to the fact that, generally, saris do not tear after only one washing. According to my fieldwork (13b) is acceptable in a context where the speaker is complaining about someone who washed a sari that was supposed to not be washed, and as a result, tore it.

- (13) a. saari nanacch-u nanacch-u kiir-i.  
 sari wash-U/I wash-U/I tear-PST  
 ‘The sari tore due to repeated washing.’
- b. #saari nanacch-u kiir-i  
 sari wash-U/I tear-PST  
 ‘The sari tore after washing.’ (Gopalkrishnan 1985 p99: 112)

In this section we learned that multi-verb constructions are syntactically small, can appear in different positions in the sentence and require pragmatic licensing principles.

### 3 Non-main verbs as Stump (1985)-style adjuncts

In this section I will suggest that the analysis put forth in Stump (1985) for English absolute adjuncts could be extended to Malayalam multi-verb constructions.

#### 3.1 Overview of Stump’s analysis

The adjuncts Stump deals with are those that express relations such as causation, (14a), serve as temporal adverbials, (13b), and conditional clauses, (14c), a.o.

- (14) a. The school is determined to avoid a scandal. The father is equally

determined to find somebody to blame. The reader, **being more experienced in such things**, knows the truth: it was murder. [causation]

- b. **Grabbing a newspaper from a guard**, Tom went back out, wiped up the dog shit and deposited it and the day’s news in a refuse can. [time adverbial]
- c. **Transposed to a trumpet or saxophone**, her creations would probably herald a new school.[conditional clause] (Stump 1985 p2: 2-4)

Stump’s general proposal is that these adjuncts, if not serving as an argument of a modal, frequency adverb or generic operator, belong to the same category as Main Tense Adverbs (MTA). He defines MTAs as “functors, [that] join with tense to characterize the interval at which some sentence is true. In this role, time adverbs are regarded as denoting functions from properties of time intervals to sets of time intervals... MTA join with temporal abstracts to produce temporal abstracts” (Stump 1985 p118).<sup>4</sup> Some examples of MTAs include *at that time, since noon, in the morning, when Mary sang, before Mary sang, after Mary sang*, as well as any adjuncts that are not arguments of modals, frequency adverbs or generic operators.

A key tenant of Stumps proposal is *indeterminacy*, which occurs when, in order to assign an interpretation to a sentence, some type of inference is needed because it constitutes part of the truth conditional meaning. Stump uses the sentence in (15) to illustrate this concept. Here ‘Picasso’ could refer to a number of things: a painting by Picasso, a man named Picasso, a postage stamp with Picasso’s picture, etc. However, for (15) to be true, the speaker/hearer must infer that the two Picassos are of the same category, i.e. two paintings by Picasso not a painting by Picasso and a man named Picasso.

(15) I saw two Picassos today. (Stump 1985 p305: 12)

The claim is that MTA’s (i.e. those adjuncts that are not the arguments of a modal, frequency adverb or generalization operator) are semantically indeterminate with respect to the temporal relationship of the two clauses and relevance of the adjunct clause to the main clause. He models this indeterminacy in the semantics using contextual variables.

The obvious question now is, how is this indeterminacy resolved? Stump proposes that the temporal and relevancy relations in MTA’s can be derived using information such as event type (instantaneous vs. state of affairs/non-instantaneous), word order/iconicity and world knowledge, a.o. The second two pieces of information are relatively self-explanatory. With respect to event type, there are three possibilities, Figure 1.

Event Type Combinations	Possible Readings
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<sup>4</sup> MTA are distinct from time adverbs like “yesterday, today, tomorrow, during the past summer” which may function as “the argument of certain expressions...the purpose of such a time adverb is simply to specify a set of time intervals.” p116



#1: both verbs describe instantaneous events	sequential reading simultaneous reading
#2: the adjunct describes instantaneous event & main verb non-instantaneous event (or vice versa)	sequential reading proper containment reading
#3: adjunct & main verb both describe non-instantaneous events/ state of affairs	sequential reading simultaneous reading proper containment reading

FIGURE 1 POSSIBLE READINGS FOR DIFFERENT EVENT TYPES

The sentence in (16) can have a simultaneous interpretation where ‘John’ notices the smoke at the same instant as having the realization, or it can have a successive interpretation where ‘John’ notices smoke one instant and the next instance has the realization. It cannot, however, have a proper containment interpretation.

(16) Noticing the smoke, John realized Bill’s house was on fire. (p319: 40)

Example (17) allows a proper containment interpretation where ‘John’ discovers the box while climbing or a successive interpretation where he discovers the box after arriving at the bottom. It cannot, however, have the simultaneousness interpretation of climbing and discovering at same time.

(17) John climbed down the well, discovering a sealed metal box at the bottom. (Stump 1985 p320: 42)

In (18) the singing could occur throughout the interval of walking, a simultaneous interpretation, or the singing could occur at some point during the walking, a proper containment interpretation.

(18) Walking beside the river, John sang. (Stump 1985 p320: 43-44)

### 3.2 Applying Stump’s analysis to Malayalam multi-verb constructions

Turning back to Malayalam, we have already seen in section 2 that pragmatics factors play a large role in multi-verb constructions. We can see by looking at the sentences in (19)-(21) that event type also plays a role in determining the semantics in Malayalam. In (19) speakers can get the simultaneous (wake up at the same instant as hearing the noise) and successive interpretations (hear the noise one instant and then wake up the next instant), if the opening of the door is viewed as an instantaneous event. A proper containment interpretation is not possible in this case. However, if a speaker assumes that the door is slowly creaking open, i.e. that hearing the noise is not an instantaneous event, a proper containment interpretation is also possible. This is strong evidence for the central claim of this paper, e.g., that non-main verbs in Malayalam are semantically underspecified. It also provides an additional argument against an account where *-u/i* is a perfective marker.

(19) [kathaku thurakunna shabdham keett-u] annamma [unarnn-u].  
door opening noise hear-U/I Annamma wake.up-PST  
‘Annamma woke up on hearing the sound of the door being opened.’  
(Gopalkrishnan 1985 p17: 3)

The sentence in (20a) shows that, when one event is instantaneous and the other is non-instantaneous/a state of affairs, either a successive or a proper containment relationship is possible, as expected. World knowledge rules out the otherwise expected proper containment relationship in (20b).

- (20) a. saari nanacch-u kiir-i  
 sari wash-U/I tear-PST  
 ‘The sari tore after washing.’ (Gopalkrishnan 1985 p99: 112)<sup>5</sup>
- b. njaan oru maanga pootticch-u thinn-u  
 I one mango pluck-U/I eat-PST  
 ‘I plucked and ate a mango.’  
 (Amritavalli & Jayaseelan 2005 p199: 37a, my glosses)

When both events are non-instantaneous, all three interpretations are possible, as predicted, (21).

- (21) avan paatu keett-u paper ezhuth-i  
 he song sing-U/I paper write-PST  
 ‘Listening to music, he wrote a paper.’

An example of the role of iconicity in determining temporal relations can be seen in (22), where switching the order of the clauses results in a different temporal interpretation. Gopalkrishnan considers sentences like (22b) to be semantically infelicitous because, according to Hindu etiquette, one should always bathe before going to a temple. If a speaker assumes that not everyone follows temple etiquette, then there is nothing wrong with (22b). This is simply another example of the role of world knowledge.

- (22) a. asha raavile kulicch-u ambalat-il pooy-i  
 Asha morning bathe-U/I temple-LOC go-PST  
 ‘Having bathed in the morning, Asha went to the temple.’
- b. asha raavile ambalat-il pooy-i kulich-u  
 Asha morning temple-LOC go-U/I bathe-PST  
 ‘Asha went to the temple in the morning and then came home and bathed.’  
 [lit. ‘Having gone to the temple in the morning, Asha bathed.’]

Turning back now to the puzzle from the introduction about multi-verb constructions with present imperfective, (24a), or future main verbs, (24b), we see that Stump’s proposal works with things we already know about Malayalam to straightforwardly provides an explanation. John (1987) and Hany Babu (1997) have argued that the future maker *-um* is a modal, and Hany Babu (2006) has argued that *-unnu* in its generic reading involves a generic operator. A modal progressive entry like that in (23) is needed on independent grounds to account for the imperfective paradox. As such, in (23), the contextual variables in non-main clauses would be bound, not via pragmatic factors as in MTAs, but by the modal and generic operators taking scope over them, causing the interpretation of the non-main clause to vary with that of the main clause.

- (23) [[progressive aspect]] =  $\lambda w.\lambda t.\lambda P_{<s,vt}. \forall w' [w \text{ INERT}_t w' \rightarrow$   
 $\exists t' [t \text{ is a non-final part of } t' \ \& \ \exists e [\tau(e) \subseteq t' \ \& \ P(w')(e)]]]$   
 (Beck & von Stechow 2015, cf. Dowty, 1979)

<sup>5</sup> Gopalkrishnan says this sentence is semantically infelicitous. However, according to my consultants, (19a) is fine when complaining about someone who washed a sari that was supposed to not be washed, and as a result, tore it.

- (24) a. njaan oru maanga pootticch-u thinn-**unnu**-Ø  
 I one mango pluck- U/I eat-IPFV-PRS  
 ‘I pluck and eat (or am plucking and eating) a mango.’  
 (Amritavalli & Jayaseelan 2005 p199: 38a, my glosses)
- b. njaan oru maanga pootticch-u thinn-**um**  
 I one mango pluck- U/I eat-FUT  
 ‘I will pluck and eat a mango.’ (Jayaseelan 2003 p68: 2b, my glosses)

#### 4 Summary

This paper has shown that Malayalam multi-verb constructions are semantically underspecified for tense and aspect and also probably structurally small. They share many properties with English absolute adjuncts, such as the ability to appear in different positions in the sentence, are subject to pragmatic licensing conditions, describe temporal relations, causes and manners, and interact with modal and generic operators. As a result, I suggest that the analysis proposed by Stump (1985) for English absolutes might be able to be extended to Malayalam multi-verb constructions.

This paper also has bearing on a larger controversy in Malayalam. The data presented here argue against the tenseless account put forth by Amritavalli & Jayaseelan (2005, et. seq.) where *-u/i* is the perfective marker. Amritavalli & Jayaseelan argue that the *-u/i* in both main and non-main verbs is a perfective marker. The data in (24), above, is one piece of evidence for their tenseless account. They argue that since *-u* cannot be a past tense marker, given its non-past meaning in sentences like (24), it is a perfective marker. However, the availability of simultaneous readings in multi-verb clauses serve as evidence against their account. Additionally, a Stump (1985) based account is compatible with a tensed language. This suggests, that multi-verb constructions actually aren’t evidence for Malayalam being tenseless. See Hany Babu & Madhavan (2003), Menon (2011), and Swenson (in preparation) for further arguments for a tensed account for Malayalam.

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